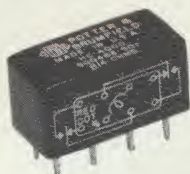


HC



HC ACTUAL SIZE

half-size
non-polarized
relay

ENGINEERING DATA

A non-polarized relay, the HC is a half-size crystal case non-latching unit designed for high reliability performance. It offers such advantages as: a high-torque motor structure; bifurcated, gold-plated silver-alloy contacts; unusually sturdy structural design, and shock and vibration resistance well beyond the requirements of most high performance applications.

The design represents an optimized relationship of contact-and-motor structure, which is the result of careful design studies conducted with the aid of Instron force-distance equipment. The motor torque curve of the relay efficiently matches the force-displacement requirements of the contact system with an adequate margin of safety throughout travel for positive performance under all specified conditions of operation.

Construction of the contact assembly provides an effective combination of contact bifurcation and wipe to insure low contact resistance and increased switching reliability over the life of the relay — particularly in low level applications.

The design balance between electrical and mechanical parameters achieves an inherent reliability which is comparable to that of full-size crystal case relays. The ability of the HC to operate where space is at a premium has been achieved without sacrificing its ability to operate reliably in rugged environments.

Specification highlights include: pull-in — approx. 180 milliwatts at 25°C; operate times — less than 3 milliseconds at nominal voltage; DPDT contacts — rated dry circuit to 2 amps at 28.0 volts DC, resistive; operational life — 100,000 operations at maximum rated load.

HC relays meet or exceed all applicable sections of

MIL-R-5757D/9, and comply with ABMA-PD-R-187 and MS FC-SPEC-339.

GENERAL:

Insulation Resistance: 1,000 megohms min. at 500 vdc between contacts, between switching circuits, and between contacts and case at +25°C.

Breakdown Voltage: 500 volts rms 60 cps between open members of same contact form, and between coil and all other insulated points. 1,000 volts rms 60 cps between all other mutually insulated points.

No contact opening in either armature position

Shock: 50 gs for 11 milliseconds.

Vibration: .130" D.A. from 10 to 55 cps.
20 gs 55 to 3,000 cps.

Pull-In: 180 milliwatts approx., at +25°C coil temperature.

Operate Time: 3 milliseconds max. at nominal voltage @ +25°C coil temperature.

Transfer Time: Approx. ½ millisecond at nominal voltage @ +25°C coil temperature.

Bounce: 1 millisecond or less measured per MIL-R-5757D.

Temperature Range: -65°C to +125°C.

Size: .800" long, .400" wide, .400" high (seated).

Weight: Approx. ¼ oz.

Terminals: Hook end solder or plug-in pins. Available hermetically sealed only.

Mountings: See back page.



POTTER & BRUMFIELD

DIVISION OF AMERICAN MACHINE & FOUNDRY COMPANY, PRINCETON, INDIANA

RIDE THE AMF MONORAIL AT THE NEW YORK WORLD'S FAIR

CONTACTS:

Arrangement: DPDT (bifurcated, gold-plated silver-alloy).

Rated: Dry circuit to 2 amps at 28.0 volts DC, resistive.

Contact Resistance: 50 milliohms before life; 100 milliohms max. after 100,000 operations at maximum rated load.

Life: 100,000 operations at maximum rated load.

COILS:

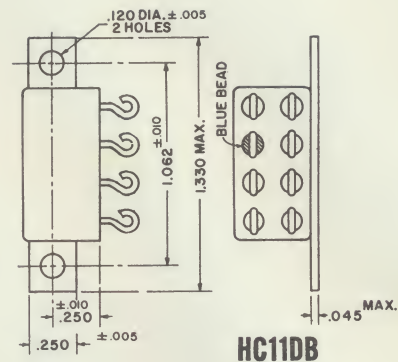
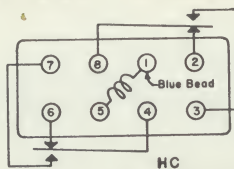
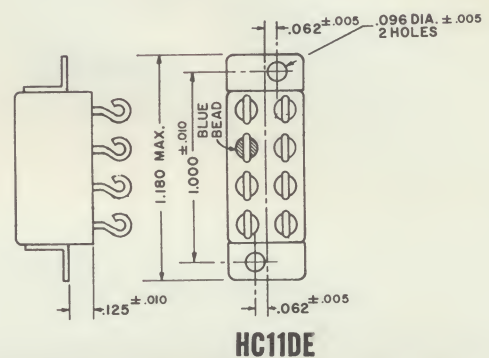
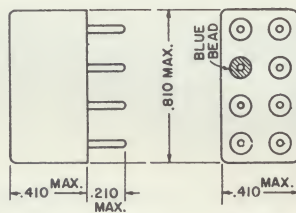
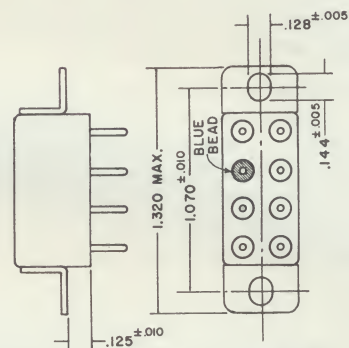
Resistance: See table, below. Available to 7,500 ohms on special order.

Power: Approximately .72 watt nominal at +25°C.

Duty: Continuous.

HC COIL DATA

Nominal Coil Voltage DC	6V	12V	24V	36V
Coil Resistance in Ohms $\pm 10\%$ @ +25°C	50	200	814	1800

Relay Circuit Diagram**HC11DB****HC11DE****MOUNTINGS:****HC11D****HC11DF**

MOUNTING	PLAIN CASE	SHOULDER BRACKETS	SHOULDER BRACKETS WITH OFFSET HOLES	FLAT MOUNTING PLATE WITH 2 HOLES
PLUG-IN HEADER	D	DF	DG	
HOOK-END SOLDER	DD	DA	DE	DB

RIDE THE AMF MONORAIL AT THE NEW YORK WORLD'S FAIR



RELAYS

POTTER & BRUMFIELD



DIVISION OF AMERICAN MACHINE & FOUNDRY CO.

INDUSTRIAL CATALOG 64

POTTER & BRUMFIELD

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Mercury-Wetted Contact Relays

Wide range of assemblies/non-bridging or bridging

An unusually wide range of mercury-wetted contact relays assuring extreme longevity, high speed operation, and unvarying dependability is offered by P&B. For instance, the JML and JMC with Form C non-bridging contacts and the JMP polarized series with Form D bridging contacts are furnished for single-side stable, bi-stable, or chopper operation, with single-wound or dual-wound coils, and shielded contacts if desired. The JM series with Form D bridging contacts is available from SPDT to 4PDT, with shielded contacts, and inverted construction, if required.



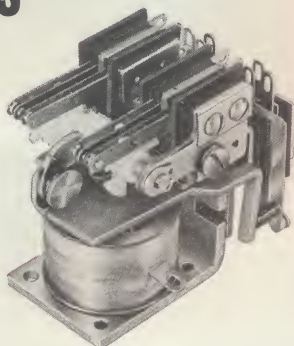
Contains all technical data, including performance characteristics, coil information, termination diagrams, and many other engineering details.

WRITE FOR CATALOG

NEW Single coil latching

GM SERIES

*impulse / sequencing
relays*



GM SERIES Particularly flexible for applications where automatic sequencing by single coil latching is indicated, the GM series is available in two standard and two special designs. A ratchet and pawl design alternately switches a 2 Form C (DPDT) contact arrangement by indirect cam action during drop-out of the armature. In the second standard version, a set of 2 Form C auxiliary contacts operated directly by the armature is added. Special versions are custom designs which utilize 10- or 12-position uni-directional printed circuit stepping switch to switch up to 250 MA.

SPECIFICATIONS

Contact Arrangements: GM: Two Form C (ratchet operated). GM with auxiliary contacts: Two Form C (aux.) and two Form C (ratchet). Specials: Modification of GM with 10 or 12-position printed circuit switches.

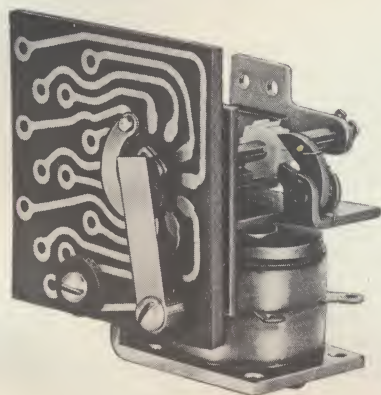
Contact Ratings: GM: to 3 amps 115 volts AC 60 cycle (non-inductive). GM with auxiliary contacts: to 3 amps 115 volts AC 60 cycle (non-inductive). Special: to 3 amps 115 volts AC 60 cycle (non-inductive) for ratchet operated or auxiliary contacts and to 250 milliamps for 10 or 12-position printed circuit switches.

Coil Voltages: AC: to 230 volts 60 cps. DC: to 110 volts.

Coil Power: AC: 9 voltamps maximum. DC: 2.5 watts minimum, 4 watts maximum.

Coil Duty: AC: 50% coil duty cycle—5 minutes maximum on, 5 minutes minimum off. DC: Continuous @ 4 watts at 25°C.

Mounting: See mounting dimensions page 18.

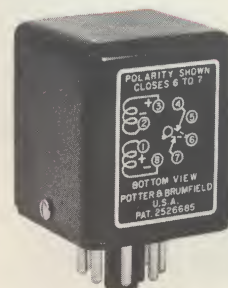


This special version uses the basic motor structure of the GM and is arranged, with certain modifications, to operate a printed circuit switch by an extension of the ratchet shaft.

NEW Polarized sensitive

MDP SERIES

*high-speed
multi-coil
relays*



MDP SERIES These extremely sensitive, small-size polarized relays provide high-speed switching and bounce-free contact performance. They have a wide range of application in telegraphy, pulse code circuits, differential controls, instrumentation, and others. Their operation depends on both the magnitude and direction of the coil current. A permanent magnet in the relay provides the polarizing magnetic flux which is affected by a small amount of coil power and causes the armature to align itself with the stronger of the two flux paths.

CONTACT ARRANGEMENTS

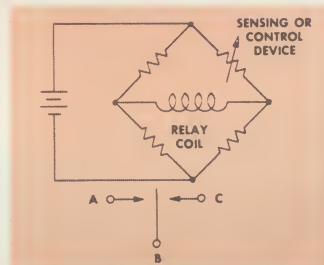
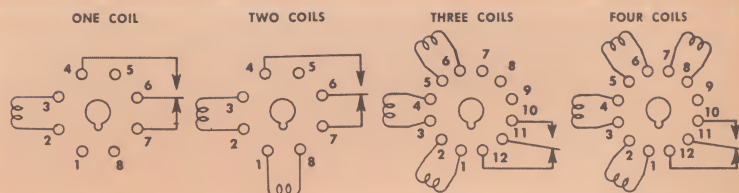
Bi-Stable: Armature remains in its last energized position, or transfers to opposite side when coil is energized with proper polarity, or remains in its position when energized with opposite polarity.

Single-Side-Stable: Armature always closes same pair of contacts when coils are de-energized. Armature transfer depends on coil signal polarity.

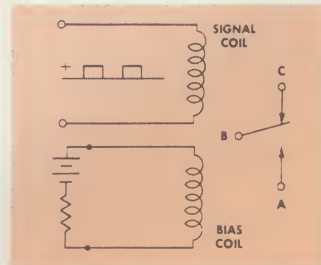
Center-Stable: Armature remains in center-off (neutral) position with contacts open when coils are de-energized, and transfers to one side or other depending on coil signal polarity.

COIL DATA

Relays are available with one, two, three or four coils. Standard coil resistance values range up to 4,000 ohms per coil. Other coils can be supplied on special order.



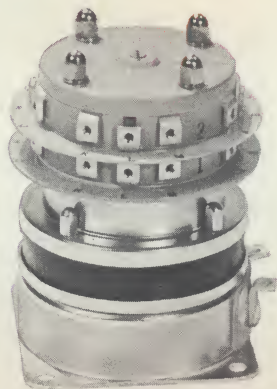
Sensing or control application.



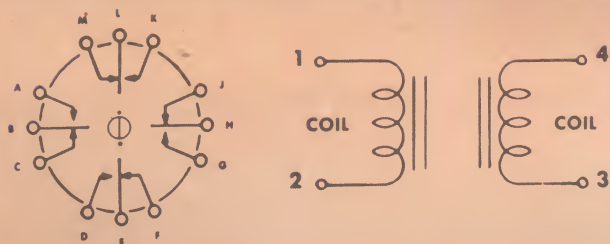
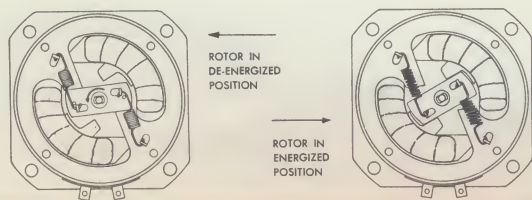
Pulse code application.

NEW Rotary shockproof

MDR *non-latching and latching relays*



MDR SERIES The reliability of MDR relays to meet or exceed the most rigorous requirements of military specifications has been proven in control circuits of nuclear reactors, missile systems and gun fire apparatus. MDR relays meet MIL-R-19523, including MIL-STD-167 for vibration and MIL-S-901 for shock. Contact chatter is absent even at impact shock blows of 2000 ft-lbs. Two versions are available, non-latching and latching. In the non-latching version, two coils in series actuate the rotor and contact mechanisms. In the latching version, two sets of coils provide a latching two-position operation.



LATCHING MDR

When coil 1-2 is energized, contacts A-B, D-E, G-H and K-L close. The line on the rotor shaft and the two dots are not in alignment.

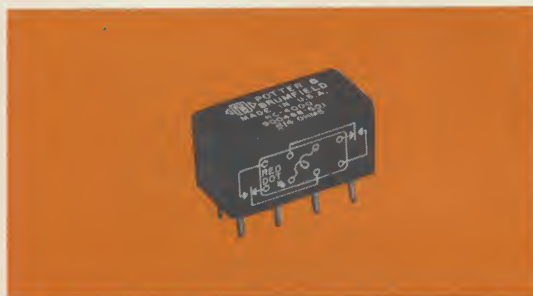
When coil 1-2 has been de-energized and coil 3-4 is energized, contacts B-C, E-F, H-J and L-M close. The line and dots are aligned. The armature is held by positive spring action in its last energized position when both coils are de-energized.

AVAILABLE IN SMALL AND MEDIUM SIZES

The small, non-latching MDR is furnished with AC coils to 12PDT; with DC coils to 8PDT. The small latching MDR with AC or DC coils is equipped with 4PDT contacts.

The medium-size, non-latching MDR is provided with AC or DC coils to 24PDT; the latching with AC coils with contacts to 16PDT. All contact arrangements are Form C (break-before-make).

TWO NEW SERIES



HC *half-size non-polarized relays*

SERIES	COIL					OPERATE (Speed) @ +25°C.
	NOMINAL DC VOLTAGE	APPROX. OPERATE POWER @ +25°C.	APPROX. POWER AT NOMINAL VOLTAGE @ +25°C.	NOMINAL RESISTANCE @ +25°C.	DUTY	
TL Two Coils: Single Coil:	to 100V to 100V	250 MW 125 MW	1 watt 0.5 watt	9,150 ohms max. 18,250 ohms max.	Continuous	6 MS max. @ nominal voltage
HC	to 75V	180 MW	0.72 watt	7,500 ohms max.	Continuous	3 MS max. @ nominal voltage

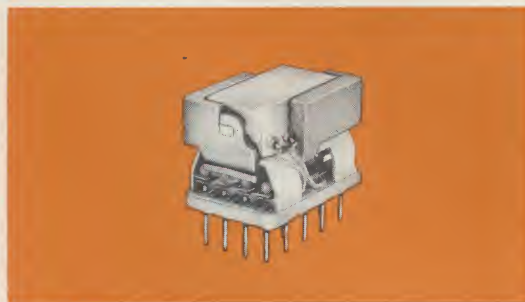
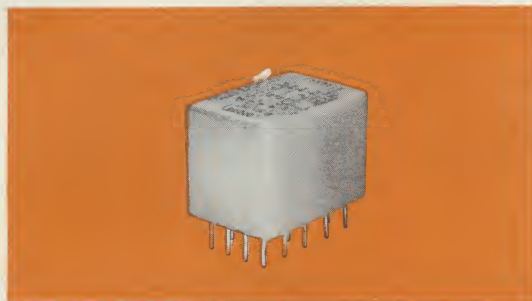
HC SERIES Designed with reliability uppermost in mind, this half-size crystal case unit requires approximately 1/8th cubic inch of space and weighs only approx. 1/4 ounce. Construction of the contact assembly provides an effective combination of contact bifurcation and wipe to insure low contact resistance and increased switching reliability over the life of the relay—particularly in low level applications.

The ability of the HC to operate where space is at a premium has been achieved without sacrificing its characteristic to operate reliably in rugged environments. Switching is effected with about 180 milliwatts @ 25°C, yet operate times of less than 3 milliseconds can be realized at nominal voltage. Meets all applicable sections of MIL-R-5757D/9 and can be furnished to meet ABMA-PD-R-187.

HC MOUNTING

PLUG-IN HEADER	Plain Case	Shoulder Brackets	Shoulder Brackets with offset holes		
HOOK-END SOLDER	Plain Case	Shoulder Brackets	Shoulder Brackets with offset holes	Flat Mounting Plate with 2 holes	Studs on top of case

POTTER & BRUMFIELD HIGH PERFORMANCE RELAYS



TL 4PDT latching relays with sealed coils SERIES

This new latching relay's high inherent reliability is due to hermetically sealed coils, bifurcated gold plated silver alloy contacts and a unique magnetic configuration which assures positive and efficient switching.

DIELECTRIC STRENGTH	CONTACTS				AMBIENT TEMPERATURE RANGE IN °C.	SHOCK 11MS duration	VIBRATION	LINEAR ACCELERATION	DIMENSIONS (Note 2)		TERMINALS
	ARRANGEMENTS	MATERIAL (Standard)	RATING (100,000 operations min.)	RESISTANCE at rated load					MOUNTING	ENCLOSURES (Approx. in inches)	
1000V rms 60 cps. except 500V between open contacts and coil to case	Bifurcated 4PDT (only)	Gold plated silver alloy	Dry circuit to 3 amps 28V DC resistive	Before life .033 ohms After life .066 ohm max.	-65 min. +125 max.	100 G (note 1)	30 G from 55 to 2000 cps. .195 total displacement from 10 to 55 cps.	400 G (note 1)	See table below	Sealed: L. 1.032 H. .75 W. .725	Plug-in pins or hook-end solder
1000V rms 60 cps. except 500V between open contacts and coil to case	Bifurcated DPDT (only)	Gold plated silver alloy	Dry circuit to 2 amps 28V DC resistive	Before life .05 ohms After life .1 ohm max.	-65 min. +125 max.	50 G (note 1)	20 G to 3000 cps. 1.30" total displacement from 10 to 55 cps.	400 G (note 1)	See table below	Sealed: L. .800 H. .400 W. .400	Plug-in pins or hook-end solder

TL SERIES Setting a new concept of high performance and reliability, the TL is a microminiature magnetic latching relay. It is designed specifically for severe environs encountered in missile applications.

Its design features include:

1. Exceptionally small size.
2. Hermetically sealed coils.
3. Bifurcated contacts, generous wipe.
4. Essentially bouncefree contact operation.
5. Functionally rugged magnetic structure.
6. Low cost replacement of two 2PDT relays.
7. Rotationally symmetric pin arrangement.

The exceptionally small size of the TL, only 0.65 cubic inch, facilitates high-density packaging. Its coils, sealed hermetically in a separate enclosure within the case of the relay, cannot contaminate the contact structure by outgassing and

forming films over contact surfaces. The strong magnetic forces present in the relay lock the contacts in the desired position, rendering them impervious to shocks and vibrations well beyond the specified range.

Various coil arrangements are available. The two-coil relay is normally operated by pulsing each coil alternately, observing proper coil polarity. By applying the specified polarity to both coils simultaneously, the relay can also be used as a differential relay. If required, the relay can be made to operate in either direction by either coil by reversing the polarity of the applied voltage. A single coil can be furnished if even greater sensitivity is desired. Direction of switching is then again dependent on reversal of applied voltage to obtain the proper polarity.

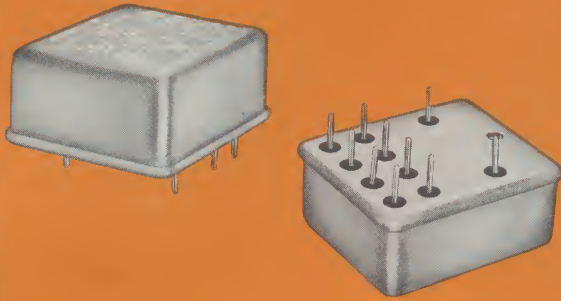
The TL meets or exceeds all applicable sections of MIL-R-5757D and can be furnished to meet ABMA-PD-R-187.

- NOTES:**
1. No contact opening
 2. Standard dimensions. For dimensional tolerances consult the factory. For mounting dimensions see page 17.

TL MOUNTING

PLUG-IN HEADER	Plain Case	Shoulder Brackets .300" from base	Shoulder Brackets .19" from base	Studs On Header	Shoulder Brackets (3) .19" from base
HOOK-END SOLDER	Plain Case	Shoulder Brackets .300" from base	Shoulder Brackets .19" from base	Flat Mounting Plate with 4 holes	Shoulder Brackets (3) .19" from base

POTTER & BRUMFIELD HIGH PERFORMANCE RELAYS



FL/FLH SERIES

MICROMINIATURE RELAYS

(SC/SCG, SL/SLG, FC/FCH, FL/FLH)

Potter & Brumfield hermetically sealed, microminiature relays utilize a permanent magnet and polarized dual coil construction. A unique magnetic configuration provides simultaneous attraction and repulsion of the balanced armature. The resulting high holding forces enable the relays to reliably operate under 100 G shock and 30 G vibration to 2000 cps, and withstand 400 G linear acceleration without contact opening.

Unusually fast operating times and high contact pressures are characteristics of these relays. These relays are designed for operation over the ambient temperature range of -65°C to 125°C .

They meet or exceed all applicable requirements of MIL-R-5757D and can be furnished to meet ABMA-PD-R-187.

SC/SCG SERIES These are the non-latching or conventionally operated microminiature versions of general crystal case configuration. A red dot on the header designates the positive coil terminal.

These relays are widely used in applications demanding greatest reliability under conditions of severe shock, vibration, and acceleration and over extreme temperature ambients.

A wide variety of mountings and terminals is available. The "G" suffix denotes terminals spaced on 0.1" grid multiples.

SL/SLG SERIES These are the latching versions of the SC/SCG relays and are operated by:

- (1) pulsing each coil alternately, observing coil polarity (approximately 230 milliwatts required to pull in @ 25°C), or
- (2) connecting coils in series and operating from a reversing (polarized) power source (approximately 180 milliwatts required to pull in @ 25°C).

Their ability to remain firmly latched in either armature position without applied coil power can significantly reduce power supply drains. The coils withstand continuous duty if a pulsing source is not available, but when this mode of operation is used a means must be provided to de-energize one coil before energizing the other. For polar operation this provision is not required.

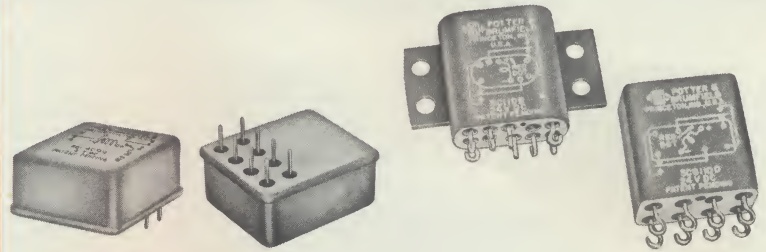
FC/FCH SERIES This is a non-latching, conventionally operated microminiature relay with a motor structure similar to the SC/SCG series. The FC/FCH configuration, however, is particularly suited for printed circuit applications. Their smallest dimension is perpendicular and their header is parallel to the plane of the mounting surface for compactness between printed circuit boards.

The contacts are of bifurcated design with high contact forces and a generous amount of wiping action assuring low contact resistance for dry circuit and the difficult intermediate (or minimum current) load areas—as well as maximum rated loads.

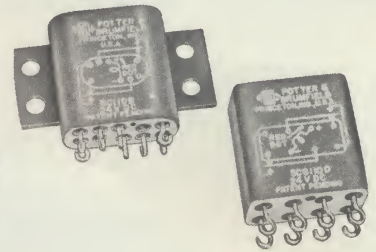
This ultra reliable contact switching may be accomplished with as little as 160 milliwatts @ 25°C . The "H" suffix denotes 5 amp contact rating instead of the standard 3 amp.

FL/FLH SERIES These are the latching versions of the FC/FCH series and are operated by:

- (1) pulsing each coil alternately, observing coil polarity (approximately 150 milliwatts required to pull in @ 25°C), or
- (2) connecting coils in series and operating from a reversing (polarized) power source (approximately 120 milliwatts required to pull in @ 25°C).



FC/FCH SERIES



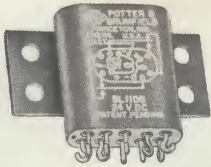
SC/SCG SERIES

SERIES	COIL					OPERATE (Speed) @ $+25^{\circ}\text{C}$.
	NOMINAL DC VOLTAGE	APPROX. OPERATE POWER @ $+25^{\circ}\text{C}$.	POWER AT NOMINAL VOLTAGE @ $+25^{\circ}\text{C}$.	NOMINAL RESISTANCE @ $+25^{\circ}\text{C}$.	DUTY	
FC FCH	to 110V	DC: 160 MW	approx. 0.65 watts	20,000 ohms max.	continuous	3.5 MS max. @ nominal voltage
FL FLH	to 80V per coil (note 7)	DC: 150 MW to pull-in (note 3)	approx. 0.65 watts	10,000 ohms max. (note 3)	continuous	3.5 MS max. @ nominal voltage
SC SCG (note 8)	to 110V	DC: 260 MW to pull-in	approx. 1 watt	20,000 ohms max.	continuous	3 MS max. @ nominal voltage
SL SLG (note 8)	to 96V per coil (note 7)	DC: 230 MW to pull-in (note 3)	approx. 1 watt	10,000 ohms max. (note 3)	continuous	3 MS max. @ nominal voltage
PW	to 60V	DC: 25 MW min.; 1.75 watts max.	180 MW	18,500 ohms max.	continuous	15 MS max. @ 150% pull- in voltage or current
SM	to 70V	DC: 75 MW min.; 1.8 watts max.	450 MW	10,000 ohms max.	continuous	5 MS max. @ 150% pull in voltage or current

PW SERIES A miniature relay with a highly permeable magnetic circuit which affords unusual sensitivities and contact pressures. Balanced armature makes it possible to operate in any position and still withstand substantial shock and vibration. Precision built to meet the rigid requirements of our Intensified Control and Reliability program. Hermetically sealed in a deep drawn brass enclosure and Radiflo tested for proper sealing. Meets the applicable requirements of MIL-R-5757D.

SM SERIES Small, fast-acting, sensitive, the SM has a light weight reed type armature which assures good shock and vibration resistance and exceptionally long mechanical life. Can be furnished with a polystyrene dust cover or hermetically sealed in a deep drawn steel enclosure. Designed for low level switching in computers, aircraft, instruments and others.

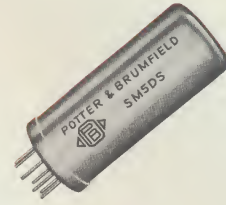
- NOTES:**
1. No contact opening.
 2. Less than 100 micro-seconds contact opening.
 3. Each coil.
 4. Other contact materials can be furnished for specific applications.
 5. Can be equipped with a collar for mounting above or below chassis.
 6. Other mountings available.
 7. Specify voltage for both operate and reset coils.
 8. Suffix "G" denotes grid header for printed circuit adaptation.



SL/SLG SERIES



PW SERIES



SM SERIES

DIELECTRIC STRENGTH	CONTACTS				AMBIENT TEMPERATURE RANGE IN °C.	SHOCK 11MS duration	VIBRATION	LINEAR ACCELERATION	DIMENSIONS*		TERMINALS
	ARRANGEMENTS	MATERIAL (Standard)	RATING (100,000 operations min.)	RESISTANCE at rated load					MOUNTING† (approx.)	ENCLOSURES (approx. in inches)	
1000V rms 60 cps except 750 V between open contacts	Bifurcated DPDT (only)	Gold plated silver alloy	FC: Dry circuit to 3 amps, 28V DC resistive FCH: Same to 5 amps	FC: Before life .05 ohms After life .1 ohm max. FCH: .020 ohm before life, after life .040 ohm max.	-65 min. +125 max.	100 G (note 1)	30 G from 55 to 2000 cps, .195" max. displacement from 10 to 55 cps. using approved mounting. (note 1)	400 G (note 1)	Grid-spaced printed circuit board	Sealed: L. 1.100 H. .485 W. .925	Plug-in pins, hook solder
1000V rms 60 cps except 750V between open contacts	Bifurcated DPDT (only)	Gold plated silver alloy	FL: Dry circuit to 3 amps 28V DC resistive FLH: Same to 5 amps	FL: Before life .05 ohms After life .1 ohm max. FLH: .020 ohm before life, after life .040 ohm max.	-65 min. +125 max.	100 G (note 1)	30 G from 55 to 2000 cps, .195" max. displacement from 10 to 55 cps. using approved mounting. (note 1)	400 G (note 1)	Grid-spaced printed circuit board	Sealed: L. 1.100 H. .485 W. .925	Plug-in pins, hook solder
1000V rms 60 cps. except 750V between open contacts	DPDT (only)	Gold on silver	2 amps @ 30V DC resistive. Upon request: 3 amps @ 30V DC.	Before life .05 ohms After life .1 ohm max.	-65 min. +125 max.	100 G (note 1)	30 G from 55 to 2000 cps, .195" max. displacement from 10 to 55 cps. using approved mounting. (note 1)	400 G (note 1)	See table below	Sealed: SC SCG L. .795 .800 H. .890 .890 W. .359 .400	Hook end solder terminals, miniature plug-in or 3" flexible leads
1000V rms 60 cps. except 750V between open contacts	DPDT (only)	Gold on silver	2 amps @ 30V DC resistive. Upon request: 3 amps @ 30V DC.	Before life .05 ohms After life .1 ohm max.	-65 min. +125 max.	100 G (note 1)	30 G from 55 to 2000 cps, .195" max. displacement from 10 to 55 cps. using approved mounting. (note 1)	400 G (note 1)	See table below	Sealed: SL SLG L. .795 .800 H. .890 .890 W. .359 .400	Hook end solder terminals, miniature plug-in or 3" flexible leads
500V rms between all elements	SPDT (only)	3/32" dia. gold-flashed silver (note 4)	1 amp @ 28V DC, or 115V 60 cps. resistive	Before life .05 ohms After life .1 ohm max.	-65 min. +85 max. (special construction for +125)	20 G (note 2) @100 MW pull-in	10 G from 55 to 500 cps, .065" max. displacement from 10 to 55 cps. (note 1)	100 G (note 1)	Plugs into 7-pin miniature tube socket (note 5)	Sealed Dia. .765 L. 1 11/16	7-pin miniature plug-in, hook-end or pierced solder lugs
500V rms between all elements	SPDT (only)	Stationary, gold-flashed silver Movable, rhodium	0.5 amps @ 28V DC, or 0.25 amps @ 115V 60 cps. resistive	Before life .05 ohms After life .1 ohm max.	-65 min. +85 max.	5 G (note 2)	.065" 10 to 55 cps. (note 1)		Sealed: plugs into 7-pin miniature tube socket (notes 5, 6) Dust Cover: two .104" dia. holes on 1/32" centers	Sealed: Dia. .765 L. 1 11/16 Dust Cover: L. 1 3/8 H. 2 9/32 W. 51/64	Sealed: 7-pin miniature plug-in header Dust cover: 3" solder leads for coil and pierced solder lugs for contacts

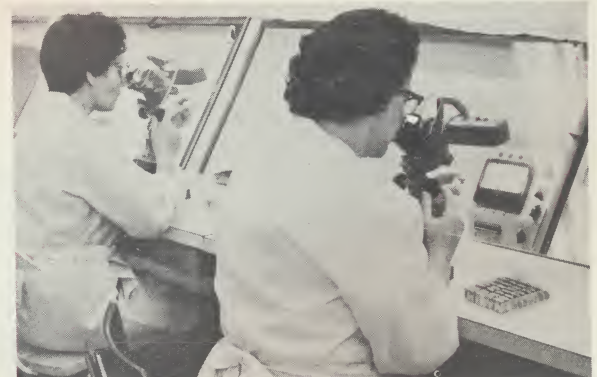
*Standard dimensions. For dimensional tolerances consult the factory.
†For mounting information, see pages 16 and 17.

SC/SCG and SL/SLG MOUNTING DESIGNATIONS

Mounting	Plug-In Header	Hook-End Solder	3" Flexible Leads
Plain case	D	DD	DL
Shoulder brackets .375 in. from base	DF	DA	DQ
even with base		DE	
offset holes .135 in. from base	DP		
Flat mounting plate with 4 holes		DB	DN
Studs on side of case	DG	DC	DM

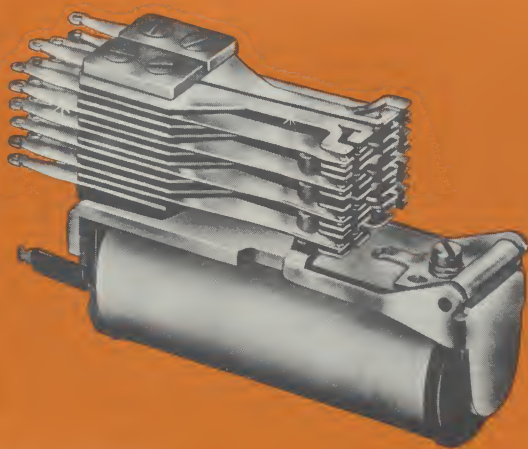
"WHITE ROOM" FACILITIES

High performance relays and complete control packages are manufactured to the rigid standards of our Intensified Control and Reliability program in a "white room," at Princeton, Indiana. This is an ultra-clean, dust-free, humidity controlled manufacturing facility where relays are assembled for use in most missile programs and other projects requiring optimum reliability. Potter & Brumfield is licensed by the Atomic Energy Commission to use Radiflo equipment for testing hermetically sealed relays.



See back cover for ordering information. 7

POTTER & BRUMFIELD TELEPHONE TYPE RELAYS



BS SERIES

BS SERIES A versatile, long coil relay for telephone systems, computers, automatic test equipment and many other applications. Long coil construction provides minimum sensitivities of 25 milliwatts for DC relays and 17.9 volt-amps for AC relays. Can be furnished for DC applications with operate or release delay slugs. Bifurcated contacts, full width armature bearing and heavy armature construction provide fast, smooth action and extended life for BS relays. Extensive life test indicates BS series will operate over 300,000,000 cycles (mechanical). Can be equipped with two snap-action switches in lieu of spring stacks or with one stack and a single snap-action switch.

LS SERIES A reliable, medium coil relay with bifurcated contacts and a stainless steel hinge bearing capable of a minimum of 100,000,000 operations (mechanical). Life test indicates over 100,000 operations at rated load, and life increases at smaller loads or with appropriate arc suppression. Heavy-duty frame maintains dimensional stability and adds to relay sensitivity and long life. Available with up to 24 springs (12 per stack). Can be furnished with both operate and release delay slugs.

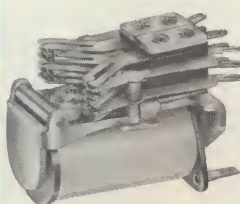
LT SERIES A fast acting, inherently reliable long coil relay with sensitivities of 25 milliwatts per movable arm. Single contact arms, sturdy frame construction and a full width hinge bearing capable of a minimum of 50 million operations (mechanical), are all part of the standard LT design. Designated as the LTD for DC voltage operation and LTL for sensitive DC current operation. Can be built with two section windings or slugs for operate and release time delays. Available open, hermetically sealed or in a protective enclosure. All feature a wide range of terminals and mountings.

TS SERIES Designed to meet the need for a short coil relay with sensitivity approaching a long coil relay. DC relays can be furnished with two concentric windings or with slugs for operate or release time delays. TS relays can be furnished with up to 20 springs (10 per stack) for DC operation or 12 springs (6 per stack) for AC operation. Available with printed circuit, taper tab or hook solder terminals.

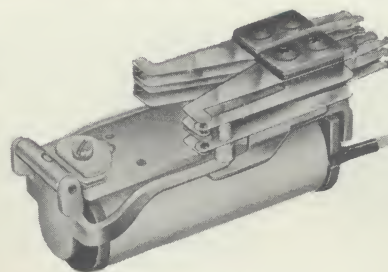
GS SERIES A short coil relay with a minimum sensitivity of 50 milliwatts. This versatile relay can be furnished for AC or DC operation with a wide range of contact combinations and special features. Available with a variety of terminals all located for front panel connections. Can be equipped with two snap-action switches in lieu of spring stacks or with one stack and a single snap-action switch. The compact design of GS relays makes them ideal for multiple switching applications where space and weight are factors.

MF SERIES Unusually low coil temperature rise is an inherent quality of this small-size, telephone type relay. Designed to operate continuously on AC power, this rise does not exceed 20°C for a 4 Form C relay at 115V 50/60 cycles at 25°C ambient. No expensive cooling need be used even when a large number of MF relays are used in an enclosed chassis. Sensitivity approximates 2.3 voltamperes. Contact forms up to 6 Form C are practical.

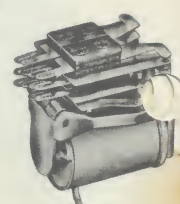
MG SERIES This subminiature relay saves space (1.5 square inches, max., open) and weight (1.2 ozs. open), and uses only 100MW of coil power per movable arm. It performs all the functions of a standard two-amp relay yet will fit easily into most miniaturization programs. Contact arrangements up to 4PDT for two-amp resistive loads.



LS SERIES



LT SERIES



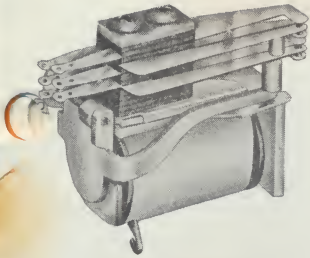
TS SERIES

SERIES	COIL			TIME VALUES	
	VOLTAGE	POWER* @ +25°C	RESISTANCE (In Ohms)	OPERATE	RELEASE
BS	DC: to 220V	DC: 25MW/movable arm min. 8 watts max.	DC: 100,000 max.	DC: 5 to 120 MS	DC: 5 to 600 MS
	AC: to 230V 60 cycle	AC: 17.9VA	(Breakdown 1,000V rms)	AC: 10 to 25 MS	AC: 10 to 20 MS
LS	DC: to 220V	65MW/movable arm min. 5 watts max.	DC: 55,000 max.	DC: 5 to 70 MS	DC: 5 to 140 MS
	AC: to 230V 60 cycle	AC: 4.4VA	(Breakdown 1,000V rms)	AC: 3 to 15 MS	AC: 3 to 15 MS
LT	DC: to 220V	DC: 25MW/movable arm min. 8 watts max.	DC: 100,000 max.	DC: 10 to 100 MS	DC: 10 to 400 MS
			(Breakdown 1,000V rms)		
TS	DC: to 220V	DC: 100MW/movable arm min. 3 watts max.	DC: 22,000 max.	DC: 5 to 40 MS	DC: 5 to 50 MS
	AC: to 230V 60 cycle	AC: 4.5VA	(Breakdown 1,000V rms)	AC: 10 to 25 MS	AC: 10 to 20 MS
GS	DC: to 220V	DC: 50MW/movable arm min. 6 watts max.	DC: 50,000 max.	DC: 5 to 50 MS	DC: 5 to 100 MS
	AC: to 230V 60 cycle	AC: 12.7VA	(Breakdown 500V rms)	AC: 10 to 25 MS	AC: 10 to 20 MS
MF	AC: to 115V 60 cycle	AC: 2.3 VA	(Breakdown 500V rms)	AC: 15 MS max.	AC: 20 MS max.
MG	DC: to 110V	DC: 100MW/movable arm min. 3.25 watts max.	DC: 13,500 ohms max.	DC: 5 to 25 MS	DC: 5 to 15 MS
			(Breakdown 500V rms)		
MH	DC: to 125V	DC: 100MW/movable arm min. 4 watts max.	DC: 22,000 max.	DC: 5 to 35 MS	DC: 5 to 25 MS
	AC: to 230V intermittent duty only	AC: 4.6VA	(Breakdown 1,000V rms)		
ML	DC: to 110V	DC: 20 MW/movable arm min. 3 watts max.	DC: 33,000 max.	DC: 30 to 120 MS	DC: 5 to 35 MS
			(Breakdown 500V rms)		

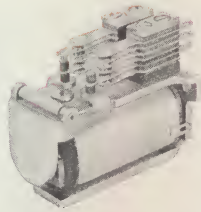
*Minimum power values given are those necessary at the "just operate" point. For reliable operation nominal power should be selected for at least two times minimum power.

MH SERIES A versatile, miniature relay used widely for many years in business machines and airborne computers where compact design and reliability are first considerations. Can be furnished to switch loads ranging from dry circuits to over 5 amps at 115 volts, 60 cycle resistive. Can be furnished in a hermetically sealed enclosure with a sealed coil for minimum contact contamination. For similar relays see MA and MB (page 15).

ML SERIES This small telephone type relay has a sensitivity of 20 milliwatts per movable arm. Applicable for transistorized computers, telephone systems and battery powered portable communications equipment. Single or bifurcated contact arms can be furnished with up to 18 springs (9 per stack), up to 6 Form C.



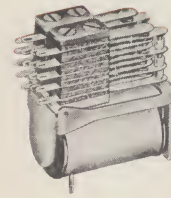
GS SERIES



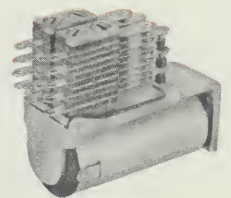
MF SERIES



MG SERIES



MH SERIES



ML SERIES

CONTACTS			MECHANICAL LIFE (Cycles)	DIMENSIONS*		WT. (approx.) (open)	SPECIAL FEATURES								
MAXIMUM NUMBER OF SPRINGS	CONTACT MATERIAL	RATING (100,000 cycles) Resistive Loads		MOUNTING (standard) (approximate)	(approx. in inches) Length x Width x Height		BS	LS	LT	TS	GS	MF	MG	MH	ML
DC: 28 (14/stack)	1/16" dia. twin palladium, standard	4 amps @ 115V 60 cycle	100 million min.	Two 8-32NC-2b tapped holes on 3/4" centers	3 3/8" x 1 1/4" x 1 1/2"	10 ozs.									
AC: 24 (12/stack)		DC: 4 amps @ 28V			3 3/8" x 1 1/4" x 2 1/2"										
DC: 24 (12/stack)	1/16" dia. twin palladium	4 amps @ 115V 60 cycle	100 million min.	Two 6-32 tapped holes on 3/4" centers. Also available with plug-in mounting for special socket.	2 1/2" x 1 1/4" x 1 1/2"	3 1/4 ozs.									
AC: 12 (6/stack —4 mov.)		DC: 4 amps @ 28V			2 1/2" x 1 1/4" x 1 5/8"										
DC: 24 (12/stack)	3/64" dia. palladium	3 amps @ 115V 60 cycle	50 million min.	Two 8-32 tapped holes on 3/4" centers	4 1/8" x 1 1/2" x 1 11/16"	12 ozs.									
		DC: 3 amps @ 28V			4 1/8" x 1 1/2" x 2 1/16"										
DC: 20 (10/stack)	3/64" dia. palladium	3 amps @ 115V 60 cycle	100 million min.	Four 3-48 tapped holes on 3/8" x 3/8" centers	1 9/16" x 1 1/2" x 1 1/16"	2 1/4 ozs.									
AC: 12 (6/stack) (4 poles max.)		DC: 3 amps @ 28V			1 9/16" x 1 1/2" x 1 13/16"										
DC: 20 (10/stack)	3/64" dia. palladium	3 amps @ 115V 60 cycle	50 million min.	Two 8-32 tapped holes on 3/4" centers	2 17/32" x 1 1/2" x 1 23/32"	10 ozs.									
AC: 18 (9/stack)		DC: 3 amps @ 28V			2 17/32" x 1 1/2" x 2 1/32"										
	1/8" dia. gold-flashed silver	5 amps @ 115V 60 cycle	Ten million min.	Two 6-32 tapped holes on 3/4" centers, or four 4-40 tapped holes on 3/8" x 3/8" centers	2 x 1 1/4" x 1 1/8"	3 ozs.									
AC: 12 (6/stack)															
DC: 12 (6/stack)	3/32" dia. gold-flashed silver	2 amps @ 115V 60 cycles DC: 2 amps @ 28V	Ten million min.	Four 3-48 tapped holes on 3/8" x 3/8" centers	1 1/16" x 1 1/16" x 1 1/32"	1.2 ozs.									
					1 1/16" x 1 1/16" x 1 1/4"										
DC: 18 (9/stack) max.	1/8" dia. gold-flashed silver	5 amps @ 115V 60 cycle	10 million min.	Four 3-48 tapped holes on 3/8" x 3/8" centers	1 21/32" x 2 5/32" x 1 1/32"	2 ozs.									
AC: 3/stack (2 poles max.)					1 21/32" x 2 5/32" x 1 19/32"										
DC: 18 (9/stack)	1/8" dia. gold-flashed silver	3 amps @ 115V 60 cycle	Ten million min.	Four 3-48 tapped holes on 3/8" x 3/8" centers	1 31/32" x 2 5/32" x 1 1/16"	2 1/2 ozs.									
					1 31/32" x 2 5/32" x 1 1/16"										
							NOTE: Standard stack insulation for all telephone relays consists of laminated phenolic spacers for temperatures up to +85° C. Special insulation for +125° C. operation is available. NOTE: Standard coil insulation for temperatures up to +85° C. Special insulation material available for operation to +125° C.								

Standard dimensions. For dimensional tolerances consult the factory.
For mounting information, see pages 16 & 17

ENCLOSURES

DUST COVERS

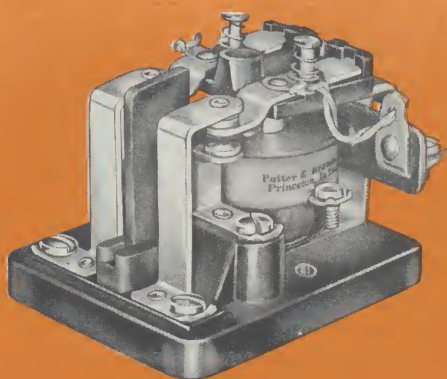
Type	Maximum Length	Dimensions (Inches) Width	Seated Ht.	Fits Relays
BS	4 15/32	1 15/64	2 13/64	BS
LT	4 9/16	2	2 1/4	LT
P	1 27/64	1 27/64	2 1/16	MH
MG	1 23/64	63/64	1 19/32	MG
LSP (16 pins)	1 23/32	1 25/64	2 1/32	LST
LSP (28 pins)	2 1/8	1 25/64	2 1/32	LST

SEALED OR DUST COVER

Type	Maximum Length	Dimensions (Inches) Width	Seated Ht.	Fits Relays
W	1 29/32	1 1/2	2 3/8	LS
D	1 15/16	1 11/32	2 11/16	TS, MH
D	2	1 11/32	2 1/2	MF
D	1 15/16	1 11/32	2 1/2	ML, MH
K	1 3/8	1 13/32	2 3/8	TS, MH
K	1 11/16	1 7/16	2 9/16	MF
K	1 21/32	1 7/16	2 9/16	ML, MH
K	1 21/32	1 7/16	2 7/8	LS, TS, MH

Type	Maximum Length	Dimensions (Inches) Width	Seated Ht.	Fits Relays
M	1 11/16	1 1/32	2 7/32	MH
M	1 23/32	1 1/32	2 13/32	MF
M	1 11/16	1 1/32	2 1/16	MH, ML
SEALED				
N	4.406	2.406	3.312	BS, LT
G	2 31/32	2 9/32	3 37/64	GS
R	1.421	.890	1 25/32	MH
T	1 17/64	1 3/16	2 7/64	MG

POTTER & BRUMFIELD POWER TYPE RELAYS



PR SERIES

PR SERIES Heavy duty power relay for industrial control applications requiring long life and fast action. Used extensively in elevator controls, motor starting and high current and voltage switching applications. A phenolic barrier between the contacts of multipole relays prevents cross contact arcing. A full floating contact carrier provides excellent contact pressures and an unusual amount of contact wipe or cleaning action. Heavy screw type terminals.

A wide range of PR relays are listed by Underwriters' Laboratories and Canadian Standards Association. (See chart on page 9). U/L File No. E22575. CSA File No. 15734.

Auxiliary Contacts All PR relays can be furnished with auxiliary contacts in 1 Form A, B or C arrangements. These contacts are rated at 5 amps. Both main and auxiliary contacts are operated by a common armature action.

Magnetic Blow Outs Normally open PR relays such as the PR3 can be equipped with permanent magnets to "blow out" arcs which occur when contacts return to the normally open position. Blow outs prevent contact welding or material transfer which reduce contact life.

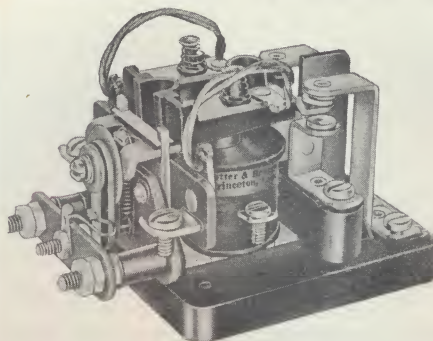
PR Dust Cover Sheet steel base has aluminum cover finished in gray baked enamel with four knockouts for $\frac{1}{2}$ " conduit. Mounts by three No. 10 holes on $1\frac{7}{8}$ " x $4\frac{1}{8}$ " centers. Fits all PR relays. P&B No. 35D013.

PM SERIES A 4PDT compact power relay for polyphase and heavy duty applications. Occupies about the same space as a conventional 2-pole relay. Rated mechanical life is in excess of 10 million operations at two cycles per second with 50% dwell time. Load life is 100,000 operations at 14 cycles per minute with 50% dwell time. Available with heavy-duty molded dust cover or steel enclosure. Adapter plates for mounting PM on PR mounting holes can be furnished.

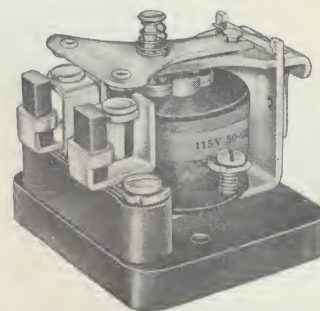
MR SERIES A medium duty power relay designed to meet the requirements of a wide variety of applications. Switches small motors, transmitters and many other power components. Features a wide range of fast action contact combinations and coil powers. Has good temperature range. MR relays can be built to meet U/L requirements. See MR/MS dust cover for enclosure.

MR/MS Dust Cover Built of heavy steel to provide maximum protection against accidental jars, dust, dirt and other foreign matter accumulations. Base has pre-drilled holes for mounting relays and enclosure. Two sealed knock-out holes for standard conduit fittings provide neater installation, and minimize broken leads. Snap-on cover can be easily removed for inspection and maintenance. Fits all MS, MR and SP relays. P&B No. 35D130.

AB SERIES An excellent medium-power relay for applications requiring rugged construction, long life and quiet operation. Available for either AC or DC operation. AB relays have a mechanical life in excess of three million operations. Listed by Underwriters' Laboratories, File No. 29244 and Canadian Standards Association, File No. 15734.



PR11AL5 with auxiliary contacts



PR3M with magnetic blowouts

SERIES	COIL			BREAKDOWN	AMBIENT TEMPERATURE RANGE IN °C.
	VOLTAGE	POWER @ +25°C	RESISTANCE (in Ohms)		
PR	AC: to 440V DC: to 110V	AC: 9.8VA DC: 1.8 watts nom.; 10 watts max. (note 3)	63,800 ohms max.	1,500V rms min. between all elements and ground	AC and DC: -55 min. AC: +45 max. DC: +85 max.
	AC: to 440V DC: to 110V	AC: 14VA DC: 4 watts nominal	37,000 ohms max.	2000V rms min. between all elements and ground	AC: -55 to +45. DC: -55 to +55. +75 available for DC
MR	AC: to 230V DC: to 110V	AC: 3.2VA DC: 1.6 watts nom.; 6 watts max. (note 3)	32,400 ohms max.	1,500V rms between all elements	AC: -45 min. +75 max. DC: -45 to +80
AB ABC	AC: to 230V DC: to 110V	AC: 6.4VA DC: 2 watts nom.; 6 watts max. (note 3)	35,000 ohms max.	1,500V rms between all elements and ground	AC: -55 min. +45 max. DC: -55 +65
AK AKC	AC: to 230V DC: to 110V	AC: 6.4VA DC: 2 watts nom.; 6 watts max. (note 3)	35,000 ohms max.	1,500V rms between all elements and ground	AC and DC -55 min. +45 max.

ABC SERIES Identical to the AB relay, the ABC has a heavy metal dust cover for protection against dust, dirt and accidental jars. All are equipped with $\frac{1}{4}$ " quick connect terminals (standard) and can be supplied with screw terminal adaptors. Listed with U/L and CSA under same file numbers as AB series.

AK and AKC SERIES Long life, quiet operation, and a heavy-duty screw terminal assembly make the AK a highly desirable relay for appliance and industrial control applications. The molded terminal block and sturdy screw terminals withstand use of power screwdrivers for attaching leads. AC or DC operation. Listed by Underwriters' Laboratories File No. 22575.

NOTES:

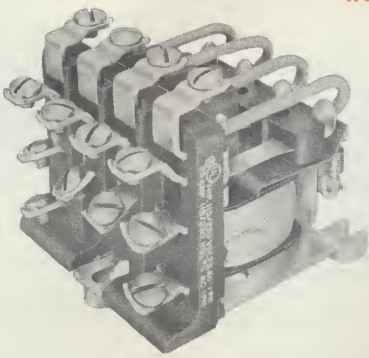
1. Other contact material can be furnished for specific applications.
2. Can be adapted to printed circuitry or plug-in applications.
3. Pull-in for power relays: DC, 75% of nom. voltage; AC, 78% of nom. voltage @ 25°C.
4. Available for rear panel wiring.

PM ADAPTER PLATE

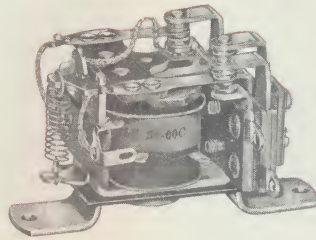
Adapter plate for mounting PM on PR mounting holes. Dimensions:
L: $2\frac{3}{8}$ "
W: $2\frac{3}{8}$ "
H: $\frac{1}{16}$ "



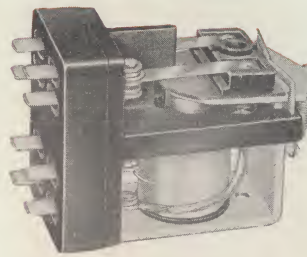
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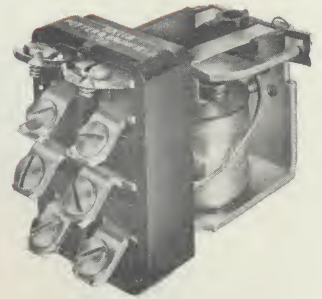
PM SERIES



MR SERIES



AB SERIES



AK SERIES

CONTACTS			MECHANICAL LIFE (Cycles)	ENCLOSURES (see bottom page 8)	DIMENSIONS*		TERMINALS
ARRANGEMENTS (See table, page 9)	MATERIAL (standard)	RATING			MOUNTING† (standard)	(approx. in inches)	
Forms; 1, 2, 3, 4, 5, 7, 8, 11 Auxiliary SPDT contacts available	3/16" dia. silver Auxiliary: 3/16" dia. silver (note 1)	See U/L ratings at right Auxiliary SPDT contacts are rated at 5 amps, 115V AC.	One million	PR dust cover (35D013)	two 3/16" dia. holes on 1 1/8" centers	Open: L. 2 1/2 to 3 3/8 ** H. 2 1/2 W. 2 1/2 **with auxiliary contacts; 4 3/16	Heavy-duty screw type (note 2, 4)
4PDT or 4PST-NO	1/4" silver-cadmium oxide	25 amps @ 115/230V, 50/60 cps resistive. 1 HP per movable arm, 115/230V AC single phase.	Ten million	PM molded, with terminals accessible. (35C058) PM dust cover (steel) (35D227)	One front key-hole and two rear channel slots for No. 8-32 screws. Adapter plate for PR mounting holes (37B370) see below.	Open: L. 3 3/16 H. 2 25/32 W. 2 1/4	Heavy duty No. 8-32 BH screws
Forms: 1, 2, 3, 4, 5, 6, 7, 8, 11, 12, 13, 14	7/32" dia. silver (note 1)	8 amps @ 115V 60 cycles, resistive	One million	MS/MR dust cover (35D130)	two 3/32" dia. holes on 2 5/8" centers (2 1/4" centers for DPST-NO or NC and DPDT relays)	Open 3PDT: L. 2 3/4 H. 1 11/16 - 2 W. 2 3/16	Pierced solder lugs
Forms: 3, 4, 6, 7, 8, 11	1/4" dia. silver (note 1)	See U/L ratings at right	Three million	See ABC for enclosed AB	AB: two 8-32 tapped holes on 1 1/4" centers ABC: one 8-32 threaded stud and locating tab	Open-AB: L. 3 H. 1 25/32 W. 1 1/8	1/4" Quick connect standard. Screw adaptors available.
Forms 3, 4, 6, 7, 8, 11	1/4" dia. silver (note 1)	10 amps @ 115V AC or 5 amps @ 230V AC non-inductive. 3/4 HP 115/230V AC, 1PH.	Three million	See AKC for enclosed AK.	AK: Two 8-32 tapped holes on 1 13/16 centers. AKC:	Open: L. 3 3/8 H. 1 59/64 W. 1 13/32	Heavy-duty screw-type

*Standard dimensions. For dimensional tolerances consult the factory.
†For mounting information, see pages 16 & 17



U/L AND CSA LISTINGS



PM SERIES

PM AC Types Contact Arrangements
PM17AY 4PDT

For U/L and CSA coil voltages are: AC: 6V to 230V 50/60 cycles. Contact ratings: 25 amps up to 230V 50/60 cycle AC resistive, 1 HP per movable arm @ 120V or 240V AC single phase.

PR SERIES

PR AC Types	PR DC Types	Contact Arrangements
PR1AY	PR1DY	SPST-NO
PR2AY	PR2DY	SPST-NC
PR3AY	PR3DY	SPST-NO-DB
PR4AY	PR4DY	SPST-NC-DB
PR5AY	PR5DY	SPDT
PR7AY	PR7DY	DPST-NO
PR8AY	PR8DY	DPST-NC
PR11AY	PR11DY	DPDT

For U/L and CSA coil voltages are: AC: 6V to 440V 50/60 cycles. DC: 6V to 110V. Contact ratings: 1 HP or 25 amps up to 230V AC 50/60 cycles single phase.

AB, ABC SERIES

AB AC Types	ABC AC Types	Contact Arrangements
AB7AY	ABC7AY	DPST-NO
AB8AY	ABC8AY	DPST-NC
AB11AY	ABC11AY	DPDT

For U/L and CSA coil voltages are: AC: 6V to 230V 50/60 cycles. Contact rating: 10 amps @ 115V AC, or 5 amps @ 230V AC non-inductive.

AK, AKC SERIES (U/L ONLY)

AK AC Types	AKC AC Types	Contact Arrangements
AK3AY	AKC3AY	SPST-NO-DB
AK4AY	AKC4AY	SPST-NC-DB
AK7AY	AKC7AY	DPST-NO
AK8AY	AKC8AY	DPST-NC
AK11AY	AKC11AY	DPDT

DC Types	DC Types	Contact Arrangements
AK3DY	AKC3DY	SPST-NO-DB
AK4DY	AKC4DY	SPST-NC-DB
AK7DY	AKC7DY	DPST-NO
AK8DY	AKC8DY	DPST-NC
AK11DY	AKC11DY	DPDT

For U/L (only) coil voltages are: AC: 6V to 230V 50/60 cycles. DC: 6V to 110V. Contact ratings: 10 amps @ 115V 50/50 cycles or 5 amps @ 230V AC non-inductive; 3/4 HP 115/230V AC 1PH.

NOTE: U/L or CSA listings do not apply to relays deviating electrically or physically from the types listed above.

Type	Maximum Dimensions (in Inches)			Fits Relays
	Length	Width	Height	
PM (Molded)*	2 15/32	2 1/4	2 23/32	PM
PM (Steel)	5 1/8	3 13/16	3 13/16	PM
PR	5 5/8	3 3/8	3 1/8	PR
MR/MS	3 5/8	2 19/32	2 3/8	MR/MS/SP
ABC	2 3/32	1 31/64	2 25/32	AB
AKC	3 1/4	1 27/64	2 11/64	AK

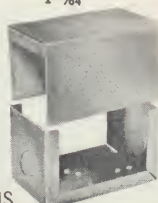
*(Incl. Relay)



PM



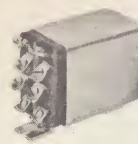
PM/PR



MR/MS

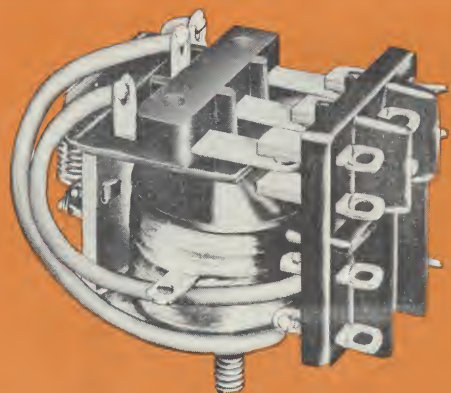


ABC



AKC

POTTER & BRUMFIELD GENERAL PURPOSE RELAYS



KA SERIES

KA SERIES A small, low cost highly efficient general purpose relay for small motors, solenoids, other relays and general automation work. Listed by Underwriters' Laboratories, File No. E29244 and Canadian Standards Association (5 amp. version only) File No. 15734.

KAP SERIES The KAP is the KA model, described above, with a high impact plastic dust cover.

KR SERIES A small, light weight relay used widely in communication equipment and automation control circuits. Ruggedly constructed for long life and dependability. Can be furnished open, hermetically sealed or enclosed in a clear cellulose plastic dust cover with standard 8 or 11-pin octal type plug.

KRP-N A special KR relay incorporating an indicator lamp for current monitoring applications. Lamp operates when coil is energized. Furnished enclosed in a clear cellulose plastic dust cover with 8 or 11-pin octal-type terminals. AC operation: 6 to 230 volts. DC operation: 6 to 110 volts.



KC SERIES Low cost plate circuit relay with good sensitivity. Available open, hermetically sealed or enclosed in a clear cellulose plastic dust cover with a standard 8 or 11-pin octal type plug. Can be furnished with a special hold down spring for horizontal or inverted mounting applications.

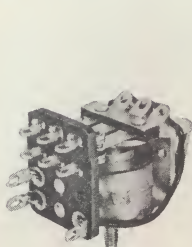
KHP SERIES This miniature, rugged 4PDT relay was especially designed to meet the exacting requirements of data processing, computer, process control, and other applications calling for high performance. It is particularly suited to installation by modern production techniques. Mechanical life is 50 million operations minimum. Nylon dust cover. Available for either AC or DC operation.

KHS SERIES The KHS is a hermetically sealed model of the KHP described above.

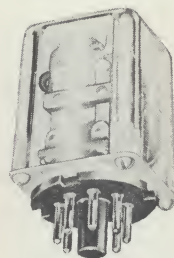
KM SERIES This subminiature relay was designed specifically for applications requiring unusually small, 3PDT relays. The KM relay has found extensive use in small business machines, alarm systems, automatic toys and communication systems.

KL SERIES Multiple contact relay. Varied contact combinations and high dielectric phenolic insulation afford great versatility and utility. Widely used in such applications as industrial controls, elevator controls, communications equipment and electronic measuring devices.

KB SERIES Latching relay. One coil operates relay to set latch and the other coil releases it. Ideal for memory work and overload applications. Operates on momentary impulse to either coil. Listed by U/L and Canadian Standards Association under same file numbers as KA Series above.



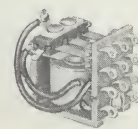
KR SERIES



KC SERIES



KHP SERIES



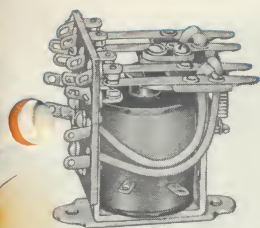
KM SERIES

SERIES	COIL			BREAKDOWN
	VOLTAGE	POWER @ +25°C	RESISTANCE (in Ohms)	
KA KAP	AC: to 230V DC: to 110V (note 1)	AC: 2.0VA DC: 100 MW min., per pole 4 watts max.	16,500 ohms max.	1,500V rms 60 cycles between elements; 500V rms 60 cycles between contacts
KR KRP	AC: to 230V DC: to 110V (note 1)	AC: 2.0VA DC: 100 MW min., per pole 4 watts max.	16,500 ohms max.	500V rms 60 cycles between all elements
KC KCP		Pull-In DC: SP—125 MW; DP— 250 MW; 3P—375 MW; 4 watts max. open; 3 watts max. enclosed	16,500 ohms	500V rms between all elements
KHP KHS	AC: to 115 V DC: to 110V (note 1)	AC: 1.2VA DC: 0.5 watts min. 2.0 watts max.	11,000 ohms max.	500V rms 60 cycles between contacts. 1000V rms 60 cycles between other elements
KM	DC only: to 48V (note 1)	DC: .75 watts min. 2.0 watts max.	4,630 ohms max.	500V rms 60 cycles between all elements
KL	AC: to 230V DC: to 110V (note 1)	AC: SP— $\frac{3}{4}$ VA; 2P and 3P—1VA; 4P— $1\frac{1}{2}$ VA DC: 100 MW/movable arm	60,500 ohms max.	500V rms 60 cycles between all elements
KB	AC: to 230V DC: to 110V (notes 1, 2)	AC: 5.0VA to 4P; 7.8VA to 6P. DC: 2.5 watts min., 4 watts max.	16,500 ohms each coil	Open 1,500V rms. Enclosed 1,000V rms between elements; 500V rms between open contacts
GA	AC: to 230V DC: to 110V (note 1)	AC: 6VA DC: 2 watts nom.	DC: 32,400 ohms max.	1,000V rms 60 cycles between all elements
GB		Pull-In DC: SP—115 MW; DP— 125 MW; 3P—200 MW; 4P—275 MW; 6 watts max.	58,000 ohms max.	1,000V rms 60 cycles between all elements
GF	AC: to 230V DC: to 110V	AC: 6VA DC: 2 watts	32,400 ohms max (DC relay)	1000V rms 60 cycles between all elements

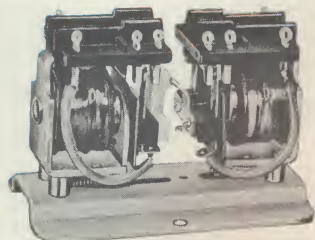
GA SERIES Low cost, general purpose, multipole, voltage switching relay used for many industrial control applications. (See GB for similar current actuated relays).

GB SERIES A medium cost, high quality current actuated relay similar to the GA series. Good sensitivity and dependability are features of the GB.

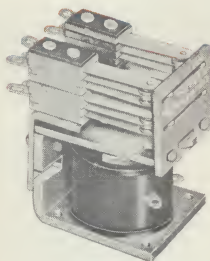
GF SERIES Medium-duty power relay with multiple switching capabilities at low initial cost. Used widely in industrial applications. Long contact arms carry $\frac{1}{4}$ " diameter silver contacts rated at 10 amps at 115V AC or 28V DC resistive. Wipe action of contacts makes them self-cleaning.



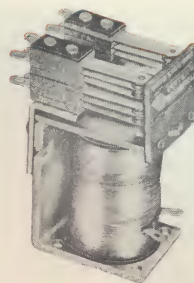
KL SERIES



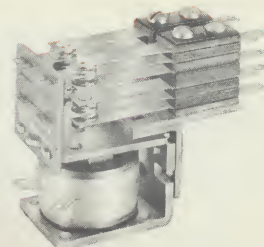
KB SERIES



GA SERIES



GB SERIES



GF SERIES

AMBIENT TEMPERATURE RANGE IN °C.	CONTACTS			MECHANICAL LIFE (Cycles)	ENCLOSURES	DIMENSIONS*		TERMINALS
	ARRANGEMENTS	MATERIAL (standard)	RATING			MOUNTING† (standard)	(approx. in. inches)	
AC and DC: -45 min. AC: +70 max. DC: +85 max.	AC and DC: to 3PDT	Silver, silver overlay and silver cad. oxide (note 3)	5 or 10 amps @ 115V AC, 60 cycles resistive (note 5)	10 million	Dust Cover or sealed: type D and special K cans	Stud: one 6-32 5/16" long with locating tab Tapped core: 6-32 with locating tab (note 6)	Open 3PDT: L. 1 13/32 W. 1 15/32 H. 1 11/16	Pierced solder lugs Coil: two 18 AWG wires Contacts: two 16 AWG wires
AC and DC: -45 min. AC: +70 max. DC: +85 max. Enclosed: AC: +55 max. DC: +70 max.	AC and DC: to 3PDT	1/8" dia. gold-flashed silver or 3/16" dia. silver cadmium oxide (note 3)	5 or 10 amps @ 115V AC, 60 cycles resistive	10 million	Sealed: type K or D can Dust Cover: clear "P" case or black nylon	Stud: one 6-32 with locating tab Core: 6-32 tapped with locating tab (note 6)	Open 3PDT: L. 1 13/32 W. 1 1/4 H. 1 11/16	Pierced solder lugs (standard) Plug-in headers available Coil: two 18 AWG wires Contacts: two 20 AWG wires
DC: -45 min. +85 max. Enclosed: +70 max.	DC: to 3PDT	3/32" dia. gold-flashed silver (note 3)	2 amps @ 115V AC, 60 cycles resistive	15 million	Sealed: type K can Dust Cover: clear "P" case	Stud: one 6-32 with locating tab. Core: 6-32 tapped with locating tab. (note 6)	Open 3PDT: L. 1 13/32 W. 1 1/4 H. 1 11/16	Dust Cover: plug-in (standard); octal tube socket. Open: Coil: two 18 AWG wires Contacts: two 20 AWG wires
AC and DC: -45 min. +70 max.	AC and DC: to 4PDT (4 Form C) DPDT-DB (2 Form Z)	3/32" dia. silver (note 3)	3 amps @ 30V DC, 115V AC resistive	AC: 50 million DC: 100 million	KHP: Dust cover KHS: Hermetically sealed	Stud: one 3-48 5/16" long (KHP with locating front)	Encl: 4PDT KHP KHS L. 1 13/32 1 3/32 W. 55/64 29/32 H. 1 1/4 1 1/2	Pierced solder lugs or plug-in. Taper tabs available. Also mounting socket with printed circuit or solder terminals.
DC: -45 min. +55 max.	DC: to 3PDT	3/32" dia. silver (note 3)	2 amps @ 28V DC or 115V AC resistive	10 million	Standard relays open; enclosures available	One 2-56 tapped hole and locating half punch	Open 3PDT: L. 1 1/4 W. 27/32 H. 1 1/16	Pierced solder lugs Coil and Contacts: one 18 AWG wire
AC and DC: -45 min. AC: +75 max. DC: +85 max.	AC and DC: to 4PDT	1/8" dia. gold-flashed silver (note 3)	5 amps @ 115V AC, 60 cycles resistive	10 million	Sealed or dust cover: type A can	Two 6-32 tapped holes on 1 1/16" centers	Open 4PDT: L. 2 1/32 W. 1 23/32 H. 1 15/16	Pierced solder lugs Coil and Contacts: two 20 AWG wires
AC and DC: -45 min. +85 max. (intermittent duty)	AC and DC: to 6PDT	1/8" dia. silver (note 3)	5 or 10 amps @ 115V AC, 60 cycles resistive (note 5)	500,000	Special dust covers or sealed: L. 2 19/32" W. 1 1/4" H. 3 11/32"	Two 5/32" dia. holes on 1 3/8" centers	Open 6PDT: L. 2 15/16 W. 1 25/32 H. 2 3/32	Same as KA series above.
AC and DC: -45 min. AC: +45 max. DC: +75 max.	AC: to 4PDT DC: to 9PDT	3/16" dia. silver (note 3.4)	5 amps @ 115V AC, 60 cycles resistive	10 million	Sealed: type E can, up to 4PDT Dust Cover: plastic cover available	Core: 8-32 tapped, with locating half punch. Special: four 6-32 tapped holes on 3/4" x 7/8" centers	Open: 4PDT 6PDT L. 1 23/32 1 23/32 W. 1 1/16 1 1/16 H. 1 25/32 2 3/32	Pierced solder lugs Coil: two 18 AWG wires Contacts: two 16 AWG wires
DC: -45 min. +75 max.	DC: to 9PDT	3/16" dia. silver (note 3.4)	5 amps @ 115V AC, 60 cycles resistive	10 million	Special: 2" L. x 1 5/8" W. x 3 19/32" H. max. w/octal plug, multiple solder header or miniature plug-in	Same as GA series above	Open 4PDT: L. 1 23/32 W. 1 1/16 H. 2 15/32	Same as GA series above.
AC: -45 to +45 DC: -45 to +75	Up to 4PDT	1/4" dia. silver (note 3)	10 amps, 115V AC 60 cycles resistive	10 million	Special enclosure on request	8-32 tapped core with locating boss	Open 4PDT L. 2 17/32 W. 1 1/4 H. 2 3/32	Pierced solder lugs Coil: two 18 AWG wires Contacts: two 18 AWG wires

NOTES:

- Pull-in for general purpose relays unless otherwise specified is: DC, 75% of nom. voltage; AC, 78% of nom. voltage.
- Specify voltage for both latch and release coils.
- Other contact materials can be furnished for specific applications.
- Up to 4 Form C relays can be built to meet U/L spacing and creepage requirements.
- Can be furnished to meet U/L requirements up to 150V.
- Bracket mounting: two 6-32 holes on 1 1/16" centers.

U/L AND CSA* LISTINGS

KA AC Types	KA DC Types	Contact Arrangements
KA5AY	KA5DY	SPDT
KA5AG		SPDT
KA11AY	KA11DY	DPDT
KA11AG		DPDT
KA14AY	KA14DY	3PDT
KA14AG		3PDT

For U/L listings coil voltages are AC: 6V to 230V 50/60 cycles. DC: 6V to 110V.
Contact ratings: For KA-AY and KA-DY: 5 amps or 1/10 HP @ 115V AC single phase, or 1/4 HP @ 230V AC single phase. For KA-AG: 10 amps or 1/4 HP @ 115V AC, single phase, or 1/3 HP @ 230V AC single phase.

*Standard dimensions. For dimensional tolerances consult the factory.
†For mounting information, see pages 16 and 17

KB AC Types	Contact Arrangements
KB17AY	4PDT
KB23AY	6PDT

For U/L listings coil voltages are AC: 6V to 230V 50/60 cycles.

Contact ratings: 5 amps @ 115V 60 cycle single phase.
Note: U/L or CSA listings do not apply to relays deviating electrically or physically from the types listed above.

* Listings by Canadian Standards Association for KA and KB relays are 5 amps 115V AC 60 cycle resistive.

POTTER & BRUMFIELD GENERAL & SPECIAL PURPOSE

SS SERIES SUPER SENSITIVE (10 mw standard) precision relay. Dual series-connected coils with balanced armature on needle-point bearings for all low energy circuits such as instruments and bridge balancing. May also be used as a differential relay by connecting the two coils in separate circuits. Maximum dimensions: L. $1\frac{3}{4}$ "—W. $1\frac{5}{16}$ "—H. $1\frac{11}{16}$ ".

MS SERIES MOTOR STARTING relays for capacitor start, induction-run motors. Operates on back EMF of start winding. Armature gap can be altered to change pull-in. Meets U/L spacing requirements. Maximum dimensions: L. $2\frac{17}{32}$ "—W. $2\frac{3}{32}$ "—H. $2\frac{1}{8}$ ".

AF SERIES 400 CYCLE relay has laminated core construction to minimize power losses at high frequencies. The small, yet ruggedly constructed AF relays are used extensively in aircraft, industrial control systems and laboratories employing 400 cycle power. Maximum dimensions: L. $1\frac{3}{8}$ "—W. $1\frac{1}{16}$ "—H. $1\frac{7}{8}$ ".

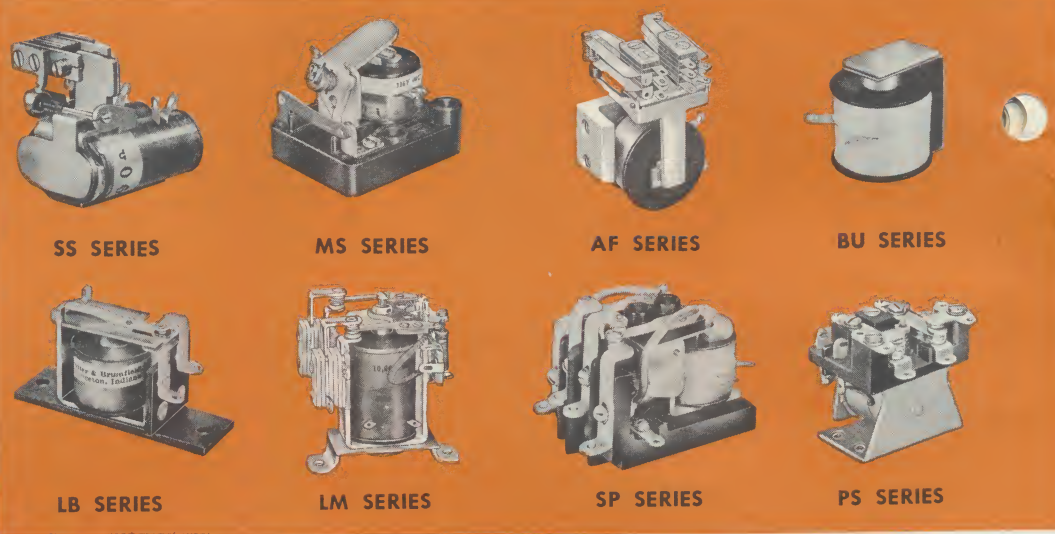
BU BUZZER AC operated coil with a spring steel armature which buzzes when coil is energized. Used extensively in test equipment, laboratories and a host of other applications. Maximum dimensions: L. $1\frac{3}{8}$ "—W. $1\frac{1}{2}$ "—H. $1\frac{1}{2}$ ".

LB SERIES LOW COST, SENSITIVE relays designed for top performance and long life at an unusually low cost. LB is factory adjusted to operate on minimum current requirements. Maximum dimensions: L. $2\frac{5}{8}$ "—W. $1\frac{1}{4}$ "—H. $1\frac{3}{8}$ ".

LM SERIES PLATE CIRCUIT relays at medium cost with high quality construction and good sensitivity. LM operates on minimum current. Pull-in adjusting screw permits quick changes for various sensitivity requirements within the operating range. Large number of contact arrangements available. Maximum dimensions: L. $2\frac{1}{4}$ "—W. $2\frac{3}{16}$ "—H. $2\frac{9}{16}$ ".

SP SERIES Balanced armature construction permits mounting in any position. Combination base and contact support of heavy molded phenolic provides good dielectric characteristics. Pinned armature assures fast, trouble free operations. Maximum dimensions: L. $2\frac{7}{16}$ "—W. $1\frac{3}{8}$ "—H. $1\frac{23}{32}$ ".

PS SERIES GENERAL PURPOSE POWER relay with a coil mounted on a core staked to a box frame. Coil mounting provides added efficiency in the magnetic circuit. All contacts are mounted on a special phenolic molding. Maximum dimensions: L. $1\frac{11}{16}$ "—W. $1\frac{9}{16}$ "—H. $1\frac{7}{8}$ ".



SERIES		SS	MS	AF	BU
CONTACTS	MATERIAL*	$\frac{1}{8}$ " dia. gold-flashed silver	$\frac{1}{32}$ " dia. silver for $\frac{3}{4}$ hp; silver cadmium oxide for 3 hp	$\frac{1}{8}$ " dia. gold-flashed silver	Not applicable
	RATING	2 amps @ 115 V AC, 60 cycles, resistive load	$\frac{3}{4}$ hp with SPST-NC, 3 hp with SPST-NC-DB	5 amps @ 115 V AC, 60 cycles, resistive load	Not applicable
	ARRANGEMENTS	DC: to SPDT	SPST-NC, SPST-NC-DB	to DPDT	Not applicable
COIL	RESISTANCE	60,000 ohms max.	2,100 ohms max.	400 ohms max.	4,600 ohms max.
	POWER @ +25°C.	DC: 2.5 MW min. (10 MW std.); 4.75 watts max.	AC: 5.9 VA	11.5 VA	4.6 VA
	VOLTAGE	DC: to 110 V	AC: to 230 V	AC: to 230 V 400 cycle	AC: to 230V 50/60 cycles
BREAKDOWN (between all elements)		500 V rms 60 cycles min.	1500 V rms 60 cycles min.	500 V rms 60 cycles min.	500 V rms 60 cycles min.
MOUNTING		two 6-32 tapped holes on $\frac{23}{32}$ " centers	two $\frac{5}{32}$ " dia. holes on $\frac{1}{16}$ " centers	two 6-32 tapped holes on $\frac{1}{16}$ " centers	6-32 NC2B tapped core
ENCLOSURES		Sealed or dust cover: type B	Dust cover: type MS/MR (page 8)	Sealed: type D	
TERMINALS		Coil: two 20 AWG wires Contacts: one 18 AWG wire	Screw type	Coil: two 20 AWG wires Contacts: two 20 AWG wires	Two pierced solder terminals for two 18 AWG wires each
SERIES		LB	LM	SP	PS
CONTACTS	MATERIAL*	$\frac{1}{8}$ " dia. silver	$\frac{1}{32}$ " dia. gold-flashed silver	$\frac{3}{16}$ " dia. silver	$\frac{1}{4}$ " dia. silver
	RATING	5 amps @ 115 V AC, 60 cycles, resistive load	5 amps @ 115 V AC, 60 cycles, resistive load	8 amps @ 115 V AC, 60 cycles, resistive load	10 amps @ 115 V AC, 60 cycles, resistive
	ARRANGEMENTS	DC: to SPDT	DC: to DPDT	SPST-NC-DB, SPDT-DB, DPDT, SPST-NO-DB, DPST-NO, DPST-NC	SPST-NO-DB, SPST-NC-DB, DPST-NO, DPST-NC, DPDT
COIL	RESISTANCE	34,500 ohms max.	58,000 ohms max.	34,500 ohms max.	33,600 ohms max.
	POWER @ +25°C.	DC: 200 MW min., 6 watts max.	DC: SP—15 MW min., DP—70 MW min., 8 watts max.	DC: 1.5 watts min., 6 watts max. AC: 3.7 VA	DC: 2.5 watts min., 6 watts max. AC: 6.0 VA
	VOLTAGE			DC: to 110 V AC: to 230 V	DC: to 110 V AC: to 230 V
BREAKDOWN		500 V rms 60 cycles min. coil to frame to ground	500 V rms 60 cycles min. between all elements	1500 V rms 60 cycles min. between all elements	1000 V rms 60 cycles min.
MOUNTING		two $\frac{3}{16}$ " dia. holes on $2\frac{1}{32}$ " centers. Special: one 6-32 tapped hole and locating half punch	two 6-32 tapped holes on $1\frac{1}{16}$ " centers	two 6-32 tapped holes on $\frac{1}{16}$ " centers	four 6-32 NC2 tapped holes on $\frac{1}{2}$ " x $1\frac{1}{16}$ " centers. Others available
ENCLOSURE			Sealed or dust cover: type A	Dust cover: Special	Dust cover: type PS
TERMINALS		Coil: two 18 AWG wires Contacts: one 12 AWG wire	Coil: two 20 AWG wires Contacts: two 18 AWG wires	Solder type	Coil: two 18 AWG wires Contacts: two 18 AWG wires

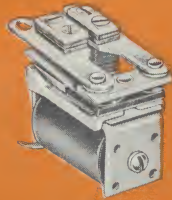
* Other contact materials available upon request.

RELAYS

INDIVIDUAL DATA SHEETS FOR EACH RELAY AVAILABLE UPON REQUEST



MP SERIES



MB SERIES



MC SERIES



KT SERIES



SA SERIES



PA SERIES



PC SERIES



MA SERIES

SERIES		MP	MB	MC	KT
CONTACTS	MATERIAL*	3/8" dia. silver	1/4" wide silver bar against 1/4" dia. silver	3/32" palladium. Gold alloy available for low voltage, low current	1/8" dia. gold-flashed silver
	RATING	25 amps @ 115 V AC, 60 cycles, resistive	60 amps @ 28 V DC, resistive (Form X only)	1 amp @ 115 V AC, 60 cycles, resistive	5 amps @ 115 V AC, 60 cycles, resistive
	ARRANGEMENTS	DC: to SPDT AC: to SPDT	SPST-NO-DM (form X) SPST-NC-DB (form Y) SPDT-DB (form Z)	DC: to 3PST AC: to DPDT	DC: to 3PDT AC: to 3PDT
COIL	RESISTANCE	DC: 34,500 ohms max.	22,000 ohms max.	22,000 ohms max.	16,500 ohms max.
	POWER @ +25°C.	DC: 1.5 watts min., 6 watts max. AC: 6.0 VA	DC: 2.7 watts min., 4 watts max.	DC: 150 MW/movable arm min., 4 watts max. AC: 4.6 VA (SP max.)	DC: 1.1 watts min., 4 watts max. AC: 2.0 VA
	VOLTAGE	DC: to 110 V AC: to 230 V	DC: to 110 V	DC: to 110 V AC: to 230 V	DC: to 110 V AC: to 230 V
BREAKDOWN (between all elements)		1000 V rms 60 cycles min.	500 V rms 60 cycles min.	500 V rms 60 cycles min.	500 V rms 60 cycles min.
MOUNTING		four 6-32 tapped holes on 3/4" x 3/8" centers	four 3-48 tapped holes on 3/4" x 3/8" centers. Others available	four 3-48 tapped holes on 3/4" x 3/8" centers. Others available	one 6-32 threaded stud 1/16" long
ENCLOSURES		Special: 2 5/16" L. x 2 1/4" W. x 2 3/32" H.	Sealed: type D and K Not available with miniature plug-in	Sealed: types D, K & M (DC relays only)	
TERMINALS		Coil: two 18 AWG wires Contacts: one 10 AWG wire	Coil: two 20 AWG wires Contacts: two 13 AWG wires	Coil: two 20 AWG wires Contacts: two 20 AWG wires	Coil: two 20 AWG wires Contacts: two 20 AWG wires
SERIES		SA	PA	PC	MA
CONTACTS	MATERIAL*	movable: silver against rhodium	1/8" dia. gold-flashed silver cadmium oxide	1/8" dia. gold-flashed silver cadmium oxide	1/8" dia. gold-flashed silver. Available with single or bifurcated contact arms
	RATING	.25 amps @ 115 V AC, 60 cycles, resistive	7.5 amps @ 115V AC, 60 cycles resistive	7.5 amps @ 115 V AC, 60 cycles, resistive	5 amps @ 115 V AC, 60 cycles, resistive
	ARRANGEMENTS	SP- 12 positions. 12 non-shorting steps	DC: 4 Form C AC: 3 Form C	DC: to 4PDT AC: to 4PDT	DC: to 4PDT
COIL	RESISTANCE	58,000 ohms max.	34,500 ohms max.	34,500 ohms max.	22,000 ohms max.
	POWER @ +25°C.	DC: 1.5 watts min., 5.5 watts max. AC: 20 VA intermittent duty	DC: 9 watts AC: 18.4 VA, both at nom. voltage intermittent duty	DC: 9 watts, AC: 18.4 VA, both at nom. voltage; intermittent duty	DC: 200 MW/movable arm min., 4 watts max.
	VOLTAGE	DC: to 110 V AC: to 230 V	DC: to 110V AC: to 230V	DC: to 110 V AC: to 230 V	DC: to 110 V
BREAKDOWN (between all elements)		500 V rms 60 cycles min.	500V rms 60 cycles min.	500 V rms 60 cycles min.	500 V rms 60 cycles min.
MOUNTING		two 6-32 tapped holes on 1 1/16" centers	No. 8-32 tapped hole with locating tab.	two 5/32" dia. holes on 2 3/4" centers	two 4-40 tapped holes on 3/8" x 3/8" diagonal centers
ENCLOSURE			Dust cover: Type A	Sealed or dust cover: type A	Dust cover only: type M
TERMINALS		Coil: two 18 AWG wires Contacts: one 20 AWG wire	Coil: two 18 AWG wires Contacts: two 18 AWG wires	Coil: two 18 AWG wires Contacts: two 18 AWG wires	Coil: two 20 AWG wires Contacts: two 20 AWG wires

* Other contact materials available upon request.

MP SERIES MOTOR STARTING relay with snap action. Small size, heavy duty, low cost SPDT relay used with capacitor-start, induction-run motors up to 1 1/2 HP. Can be built with a magnet if whole snap action is desired. Maximum dimensions: L. 2 5/16"—W. 1 1/4"—H. 1 7/8".

MB SERIES MINIATURE DC CONTACTOR designed for very high current applications. Rugged construction insures long life. Handles 150 ampere surges for 0.3 sec. Maximum dimensions: L. 1 5/8"—W. 2 7/32"—H. 1 3/8".

MC SERIES RF SWITCHING TELEPHONE TYPE relay built with ceramic contact spacers to minimize losses at high frequencies. Intercontact capacitance, 1.5 pf. max. open; 6 pf. enclosed AC relays for intermittent duty only. Maximum dimensions: L. 1 15/32"—W. 3/4"—H. 1 25/32".

KT SERIES ANTENNA SWITCHING relays with glass base insulation for minimum RF loss to switch 300 ohm line. Rugged in construction, small in size. Maximum dimensions: L. 1 15/32"—W. 1 1/4"—H. 1 11/16".

SA SERIES STEPPING relay utilizing a printed circuit board to provide twelve consecutive step positions. Armature pawl drives a ratchet wheel to step movable contact arm. For step selection in low current applications. Maximum dimensions: L. 2 17/32"—W. 1 3/4"—H. 2 15/32".

PA SERIES IMPULSE LATCHING relay for on-off and current reversal switching on alternate pulses. Employs re-centering spring-loaded pusher rod. Maximum Dimensions: L. 2 3/32"—W. 2"—H. 1 3/4".

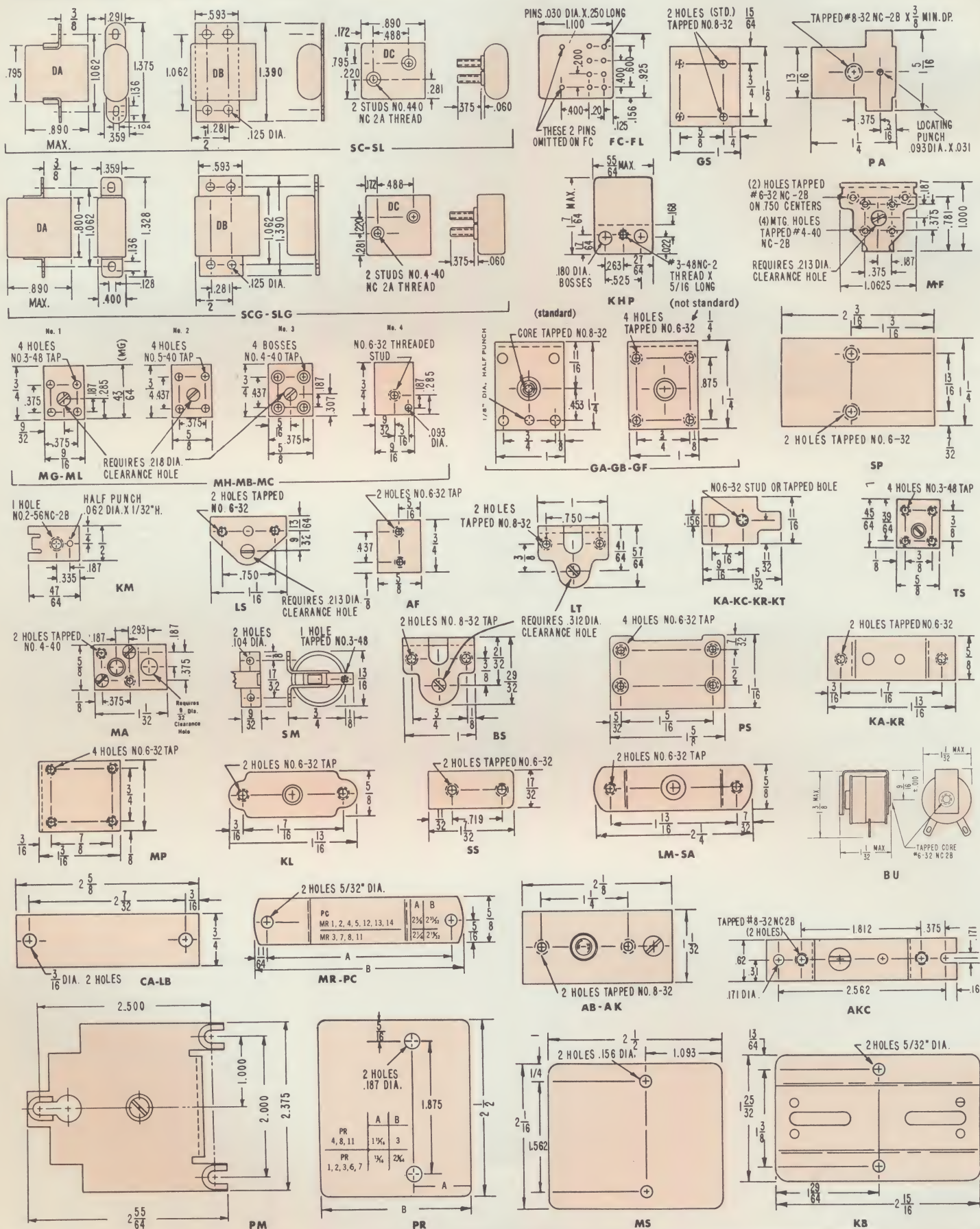
PC SERIES IMPULSE LATCHING relay similar to PA, but utilizes a re-centering guided pusher rod, and has different contact arrangement. 60 millisecond pulses to coil @ nom. voltage. Maximum dimensions: L. 2 21/32"—W. 2 1/16"—H. 2 5/16".

MA SERIES LATCHING relay for applications where electrical latch-in and manual reset control is required. A good performing miniature latching relay that operates on 4 watt coil loads at +25°C. (See MH series for additional MA features, pages 8 and 9.) Maximum dimensions : L. 2 17/32"—W. 2 7/32"—H. 1 3/8".

See back cover for ordering information. 15

MOUNTING DIMENSIONS **POTTER & BRUMFIELD**

(DIMENSIONS FOR REFERENCE ONLY)



See back cover for ordering information.

GENERAL INFORMATION

CONTACTS

P&B standard relays carry a number to designate contact arrangements. Abbreviations are used for indicating the switching arrangement of each number:

1—SPST-NO	7—DPST-NO	13—3PST-NC	19—5PST-NC
2—SPST-NC	8—DPST-NC	14—3PDT	20—5PDT
3—SPST-NO-DB	9—DPST-NO-DB	15—4PST-NO	21—6PST-NO
4—SPST-NC-DB	10—DPST-NC-DB	16—4PST-NC	22—6PST-NC
5—SPDT	11—DPDT	17—4PDT	23—6PDT
6—SPDT-DB	12—3PST-NO	18—5PST-NO	

SP—Single Pole 3P—Three Pole SB—Single Break ST—Single Throw
 DP—Double Pole 4P—Four Pole DB—Double Break DT—Double Throw
 DM—Double Make NO—Normally Open NC—Normally Closed

For other than standard relays shown in the above table P&B relays are designed in accordance with alphabetical indicators (Form A, B, C, etc.), which denote the switching arrangement:

CONTACT FORMS

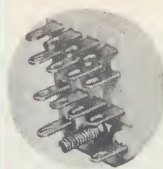
Design	Sequence	Symbol	Form
SPST-NO	Make (1)		A
SPST-NC	Break (1)		B
SPDT	Break (1)—Make (2)		C
SPDT	Make (1) before Break (2)		D
	Break (1)—Make (2) before Break (3)		E

UNDERWRITERS' LABORATORIES LISTINGS

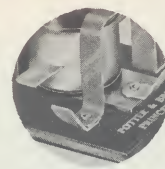
Certain appliance, motor control, industrial, and other relay applications require U/L listed relays. In Canada, the Canadian Standards Association listing may be necessary. Many P&B relays carry both U/L and CSA listings, thus saving manufacturers the extra cost and time required to have new designs examined.

TERMINALS

The choice of terminals is almost infinite; screw type, threaded stud, snap on tab, pierced or wire solder lug, taper tab, octal base and other plug-in types meet every connection requirement. Terminals can also be supplied for printed or dip solder circuitry.



Taper tab



Snap-on solderless



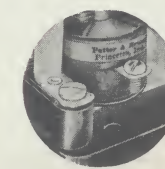
Pierced solder lug



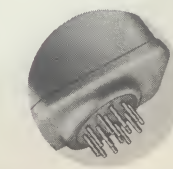
Tube type octal plug



AN type connector



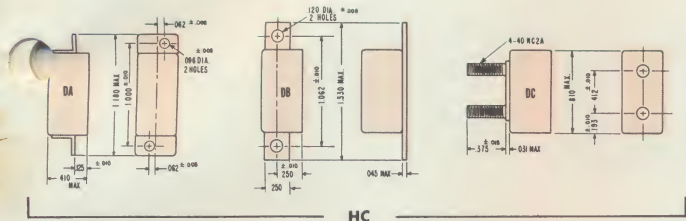
Standard screw terminals



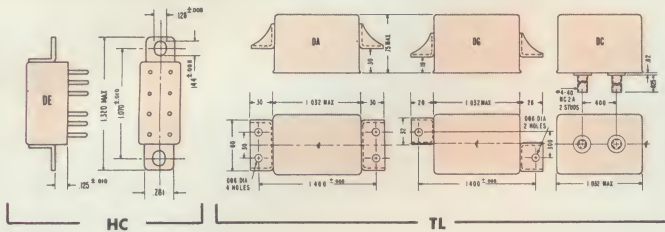
Up to 20 pin plug-in



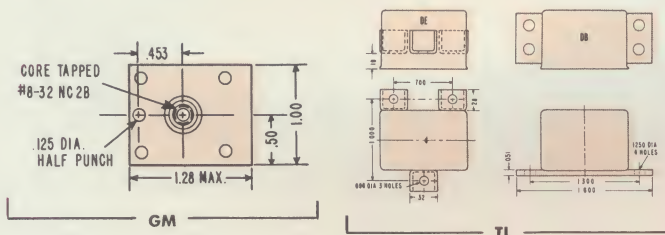
For printed circuitry



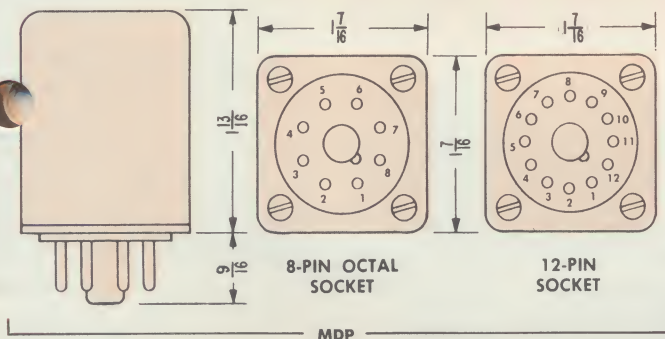
HC



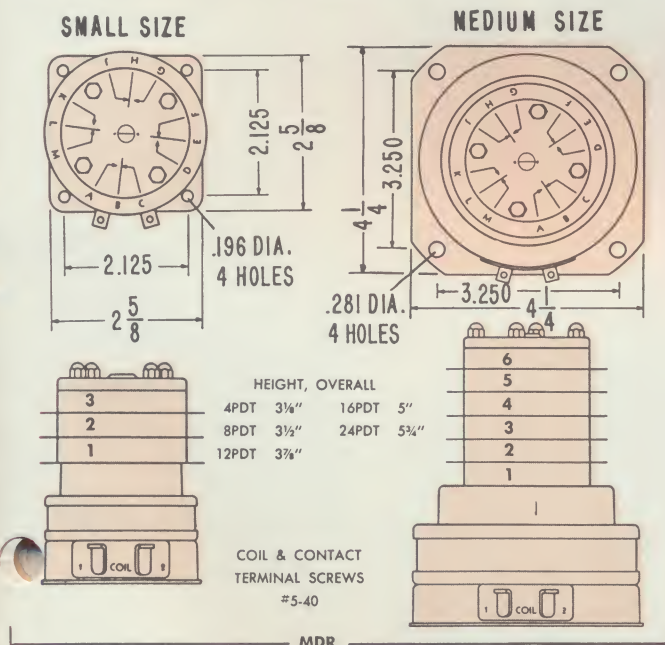
HC



GM



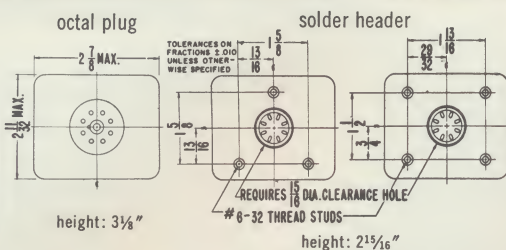
MDP



MDR

POTTER & BRUMFIELD ENCLOSURES (DIMENSIONS FOR REFERENCE ONLY)

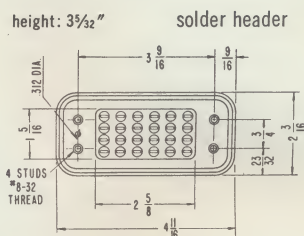
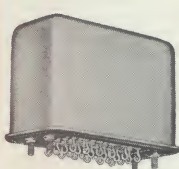
A type



for use with relays

KL
LM
PC

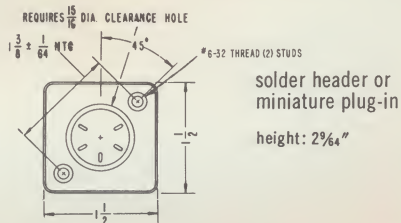
L type



for use with relays

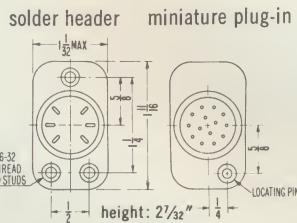
BS
LT
6MH

B type



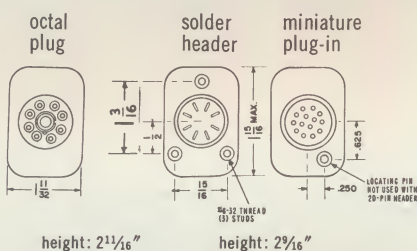
SS

M type



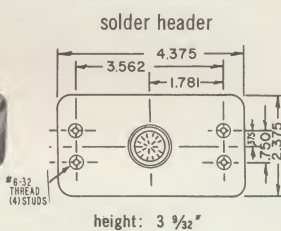
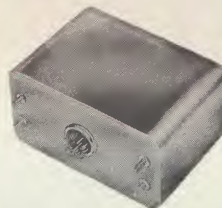
KE
MC
MH

D type



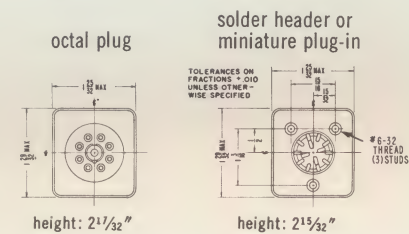
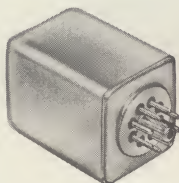
AF
MB
MC
MH
TS

N type



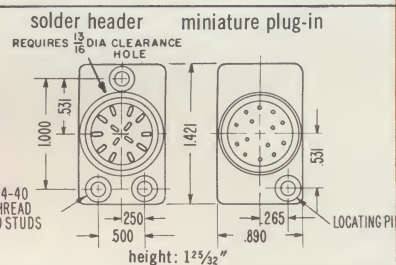
BS
LT
6MH

E type



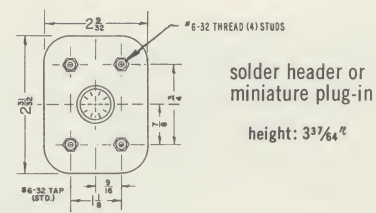
GA
MB
MC
MH

R type



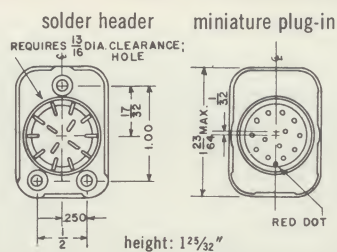
MH

G type



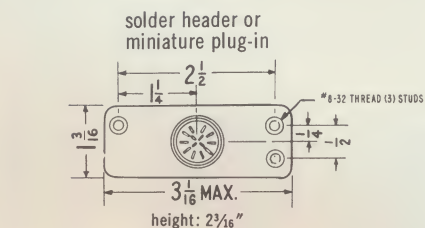
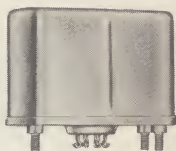
GS

T type



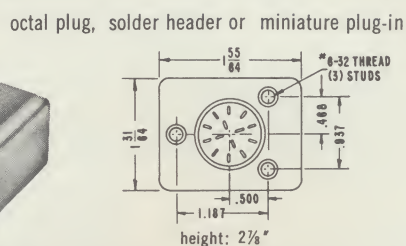
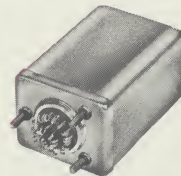
MG

H type



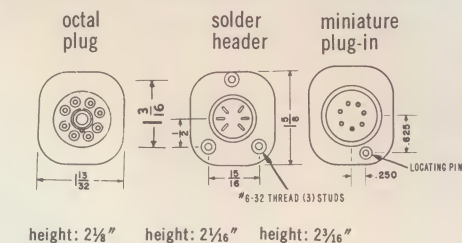
LK
2MC
2MH
2KR

W type



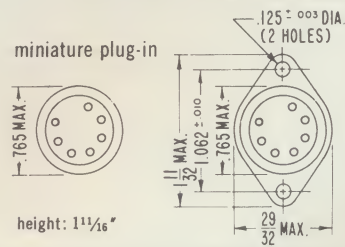
LS

K type



KA
KC
KR
MB
MC
MH
TS

PW, SM type

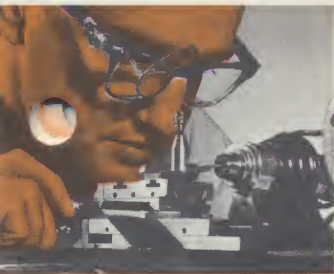
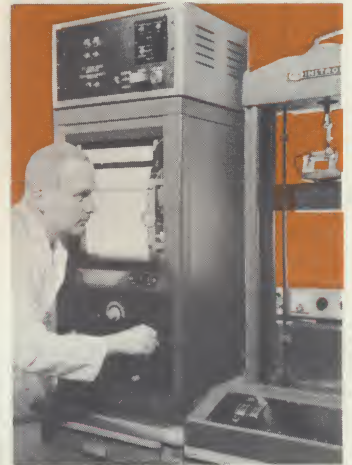


PW
&
SM
only

a *Quest* that never ends...

The quest for ever-greater product reliability never ends at P&B. Manufacturing methods, processes and equipment are constantly re-evaluated and kept current with every technical advance. Test equipment for prototype evaluation as well as production relays covers a wide spectrum. Some of this equipment is shown in the photographs below.

Three modern plants in the United States and one in Canada are devoted solely to engineering and producing electromagnetic relays. The specialized production and application experience accumulated by our personnel over more than a third of a century is probably unique in the relay field. Our sales/engineering organization, in principal cities throughout the United States and Canada, can give you valuable assistance in selecting precisely the right relay for each requirement.



Hand-fabricated parts for prototype relays call for skilled craftsmen using specialized equipment, such as this jeweler's lathe.



Comparators are extensively used to make sure all fabricated parts are within precise tolerances.



Four-chamber combination ultrasonic/vapor cleaner removes foreign material and contaminants from sub-assemblies and completed relays.



U.S. Government inspected Standards are used to calibrate all test equipment employed by both the Engineering and Production departments.

Literally millions of coils are wound every year in this large, well equipped department.



Precision adjusting calls for skill and patience. P&B's total output is often determined by the number of man hours available in our adjust departments.



Test set-up, including two oscilloscopes, used for final inspection of mercury-wetted contact relays.



P&B fabricates most of its own metal and plastic parts insuring greater quality and production control.



ORDERING INFORMATION

I State the following:

- P & B type
- Mounting required
- Type of enclosure if any
- Terminals
- Conditions; i.e., humidity, temperature, shock vibration, finish, etc.

II Contact Characteristics

- Arrangement
- Voltage (AC or DC)
- Current (Inrush and steady state)
- Type of load (lamp, resistive, capacitive, etc.)

- Open circuit voltage
- Frequency and number of operations required.

III Coil Characteristics

- Normal Voltage or Current and frequency
- Maximum Voltage or Current
- Pull-in V or I with tolerance
- Drop-out V or I with tolerance, if required
- Resistance, if required to match circuit characteristics
- Duty cycle
- Operate and release time; maximum and minimum

POTTER & BRUMFIELD SALES REPRESENTATIVES

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Timothy C. Connolly
Cartwright & Bean
3520 Mariposa Road
Phone: 536-5862

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4344 East Indian School Road
P. O. Box 10497
Phone: 265-9185
265-9037

CALIFORNIA, Long Beach 8
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5217 Arbor Road
Phone: NEvada 6-9321
HARrison 9-0459

CALIFORNIA, Los Altos
Elliott Recht Associates
175 South San Antonio Road
Phone: 941-0336

COLORADO, Denver 9
R. G. Bowen Company, Inc.
721 South Broadway
Phone: RAce 2-4641
RAce 2-4642

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Electronics, Inc.
P. O. Box 797
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Ed W. Irby (Industrial Sales)
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2505 Nancy Street
Phone: GARDen 5-8284

GEORGIA 30305, Atlanta
Everett Bean
Cartwright & Bean
3223 Cain's Hill Place, N. W.
Phone: 237-2273

HAWAII, Honolulu
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Dougherty Enterprises
P. O. Box 3497
1164 Waimanu Street
Phone: 90544 or 504987

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Balhorn & Welch, Inc.
7185 West Armitage Avenue
Phone: TUXedo 9-5011

ILLINOIS, LaGrange
Bierhaus Sales Company
633 South LaGrange Road
Phone: BISHop 2-3250 (Chicago)
Fleetwood 4-3032 (LaGrange)

INDIANA, Fort Wayne
Milton Gamble
R. O. Whitesell & Associates, Inc.
Central Bldg., Room 272
203 West Wayne Street
Phone: EAsTbrook 3287

INDIANA, Indianapolis 19
R. O. Whitesell & Associates, Inc.
6620 East Washington Street
Phone: FLEetwood 9-5374
FLEetwood 9-5375

INDIANA 47570, Princeton
Potter & Brumfield
Phone: (812) FULTon 5-5251

KENTUCKY, Louisville 12
John Bishop
R. O. Whitesell & Associates, Inc.
3933 Bank Street, Arcade Bldg.
Phone: SPRing 6-2024

LOUISIANA 70003, Metairie
David McCoy
Cartwright & Bean
1812 Bullard Avenue
Phone: 834-8312

MASSACHUSETTS, Cambridge 42
Glenn M. Hathaway
Electronics, Inc.
238 Main Street
Phone: KIRkland 7-0380

MICHIGAN, Detroit 27
Hilltronics, Inc.
13720 Puritan Avenue
Phone: BRoadway 2-4320
BRoadway 2-4321

MICHIGAN, Kalamazoo
Gilbert Noble
Hilltronics, Inc.
1030 East Walnut
Phone: (616) 345-4551

MINNESOTA, Minneapolis 17
A. J. Warner Company
5022 29th Avenue South
Phone: PARKway 9-7371

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L. R. Harry & Associates
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Phone: (816) 763-3634

MISSOURI, St. Louis 35
Giordano Sales Company
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Jack W. McCoy
300 Marlton Pike
Phone: HAZel 8-3444
WALnut 2-7333 (Philadelphia)

NEW JERSEY, Englewood
J. A. Rudy & Associates
409 Grand Avenue
Phone: LOWell 7-5880
LOWell 7-5881
OXford 5-7850 (New York City)

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Carl Carlberg
Bowen & Carlberg
P. O. Box 3177, Station D
2628 San Mateo Blvd., N. E.
Phone: 265-1579

NEW YORK, Buffalo 17
The Robert F. Lamb Co., Inc.
3407 Delaware Avenue
Phone: TR 6-3757

NEW YORK, De Witt
J. F. Harm & Associates
103 Pickwick Road
Phone: GIBson 6-2540

NEW YORK, Latham
Thos. Carse Sales Co., Inc.
P. O. Box 71
Phone: 785-5844

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See New Jersey, Englewood
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AMF Overseas Group
Division of American Machine
& Foundry Company
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Cartwright & Bean
625 Harwyn Drive
Phone: 537-8561

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Joe Stegman
R. O. Whitesell & Associates, Inc.
Boerger Bldg., Office 17
2209 Losantiville Avenue
Phone: MEIrose 1-9210

OHIO 44115, Cleveland
Scott & Steffen, Inc.
1836 Euclid Avenue
Phone: 861-2626

OHIO 43215, Columbus 15
Scott & Steffen, Inc.
79 East State Street, Room 616
Phone: CAPitol 8-2313

OHIO, Dayton 39
Robert Thinnies
R. O. Whitesell & Associates, Inc.
4119 South Dixie Avenue
Phone: 298-9546

OKLAHOMA 74150, Tulsa
Components Incorporated
P. O. Box 3395
Phone: LUther 3-9149

PENNSYLVANIA, Allentown
Beil & Whitaker, Inc.
1303 North Troxell Street
Phone: HEMlock 4-5220

PENNSYLVANIA, Dover
Ray F. Schiding
Beil & Whitaker, Inc.
Box 384, R.D. #2
Phone: 292-4071

PENNSYLVANIA, Philadelphia
See New Jersey, Cherry Hill
Jack W. McCoy
Phone: WALnut 2-7333
(Philadelphia)

PENNSYLVANIA 15222, Pittsburgh 22
Scott & Steffen, Inc.
507 Liberty St. (Empire Bldg.)
Phone: 471-5233

PENNSYLVANIA, Reading
Beil & Whitaker, Inc.
3623 Jacksonwald Avenue
Phone: FRanklin 5-6837

TENNESSEE 38104, Memphis
James B. Cartwright
Cartwright & Bean
560 South Cooper Street
Phone: BRoadway 6-4442

TEXAS, Dallas 5
John B. Guenther
4533 North Central Expressway
Phone: LAKeside 8-6286

UTAH, Salt Lake City 11
R. G. Bowen Company, Inc.
451A East 3rd South
Phone: EMpire 3-4528

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D. J. Fagge
Potomac Electronics, Inc.
P. O. Box 36
604 Montgomery Street
Phone: 836-1630

VIRGINIA, Alexandria
Potter & Brumfield
(Federal Agencies)
D. J. Fagge
P. O. Box 36
604 Montgomery Street
Phone: 836-1630

VIRGINIA, Charlottesville
C. L. Martin
Potomac Electronics, Inc.
P. O. Box 65
Phone: 295-5402

WASHINGTON, Seattle 15
Ray Johnston Company, Inc.
1011 East 69th Street
Phone: LAkeview 4-5170

WISCONSIN 53212, Milwaukee
E. A. Dickinson & Associates, Inc.
3612 North Green Bay Avenue
Phone: CONcord 4-1080

CANADA Manufacturing Facility
Potter & Brumfield
Division of AMF Canada Limited
135 Oxford Street
Guelph, Ontario
Phone: TAYlor 2-0390

CANADA, North Vancouver, B. C.
Chas. L. Thompson, Ltd.
3115 Lonsdale Avenue
Phone: 987-9388

CANADA, Montreal 9
Aeromotive Engineering
Products, Ltd.
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